

The chart below demonstrates the properties of drugs D-G as determined from dose-response curves. Drugs D-G produce the same therapeutic effect via the same mechanism, but each drug has a unique safety profile. Which drug is most potent?

			Certain
	ED ₅₀	Therapeutic	Safety
Drug	(mg)	Index	Factor
D	1.0	7	2.1
E	5.0	9	4.0
F	33.0	15	3.0
G	0.5	4	2.8

- ☐ A. Drug D
- ☐ B. Drug E
- ☐ C. Drug F
- ☐ D. Drug G

Ventricular tachycardia associated with an acute myocardial infarction is best managed by intravenous administration of which of the following medications?

- ☐ A. Digitalis
- ☐ B. Quinidine
- ☐ C. Lidocaine
- ☐ D. Atropine
- ☐ E. Dobutamine

A 4-year-old child with sickle cell disease presents to the emergency department with a temperature of 40°C (104°F). The mother states that the child has been lethargic for the past 5 hours. Physical exam reveals nuchal rigidity with positive Kernig sign and Brudzinski sign. The patient has had no known sick contacts, takes no medication, and immunizations are up to date. Analysis of the cerebrospinal fluid would most likely reveal which of the following pathogens?

- ☐ A. *Listeria monocytogenes*
- ☐ B. *Escherichia coli*
- ☐ C. Group A β -hemolytic streptococcus
- ☐ D. Group B streptococcus
- ☐ E. *Streptococcus pneumoniae*

A 10-year-old girl has pain in the right hip region. A radiograph reveals changes of osteomyelitis involving the femoral metaphysis, with extension to the subperiosteal region and abscess formation. Which of the following organisms is most often responsible for this clinical picture?

- ☐ A. *Neisseria gonorrhoeae*
- ☐ B. *Staphylococcus aureus*
- ☐ C. *Haemophilus influenza*
- ☐ D. *Salmonella*
- ☐ E. Group B *Streptococcus*

Which of the following statements would best describe a patient in the well-fed state?

- ☐ A. Acetoacetate is the major fuel for muscle
- ☐ B. Glucose transport into adipose tissue is decreased
- ☐ C. NADPH production by the hexose monophosphate shunt is decreased
- ☐ D. Glucose is the major fuel used by the brain
- ☐ E. Amino acids are utilized for glucose production

A 23-year-old woman without any prior history of psychiatric problems has a 4-week episode of insomnia, increased psychomotor activity, and impulsivity. She has no history of substance abuse or general medical conditions. Prior to this episode, she has worked steadily as a realtor. She has no history of depressive episodes, and there have been no recent emotional stressors. Mental status examination reveals a well-oriented female with pressured speech and labile mood, but no psychotic symptoms. Laboratory studies including TSH are normal. Which of the following conditions is most suggested by this presentation?

- ☐ A. Pheochromocytoma
- ☐ B. Mania
- ☐ C. Depression
- ☐ D. Anxiety
- ☐ E. Hyperthyroidism

Atropine is an effective antidote to poisoning by which toxic agent?

- ☐ A. Carbaryl
- ☐ B. Parathion
- ☐ C. Methanol
- ☐ D. Chlorophenothane (DDT)
- ☐ E. Naphthalene

An 8-year-old girl has multiple painful, swollen lymph nodes in her left inguinal region that have worsened over the past 4 days. An inguinal lymph node biopsy reveals large germinal centers containing numerous mitotic figures and numerous neutrophils about the follicles and in the sinuses. The most likely cause for these histologic changes is

- ☐ A. Acute lymphadenitis
- ☐ B. Acute lymphoblastic leukemia
- ☐ C. Sarcoidosis
- ☐ D. Follicular lymphoma
- ☐ E. Cat scratch disease

Which of the following changes would increase membrane excitability by the greatest amount?

- ☐ A. Decreasing extracellular hydrogen ion
- ☐ B. Increasing extracellular sodium
- ☐ C. Increasing extracellular potassium
- ☐ D. Decreasing extracellular chloride
- ☐ E. Decreasing extracellular calcium

A motorcycle accident victim has lost abduction in his right arm. Which of the following parts of the brachial plexus has been damaged?

- ☐ A. Lower trunk and medial cord
- ☐ B. Middle trunk and posterior cord
- ☐ C. Middle trunk and lateral cord
- ☐ D. Lower trunk and lateral cord
- ☐ E. Upper trunk and posterior cord

As the uterine artery passes from the anterior division of the internal iliac artery to the uterus, it crosses a structure that is sometimes mistakenly ligated during hysterectomy. This structure is the

- ☐ A. Ovarian ligament
- ☐ B. Ovarian artery
- ☐ C. Ureter
- ☐ D. Mesovarium
- ☐ E. Round ligament of the uterus

In the second trimester of pregnancy, a 30-year-old woman discovers a lump in her left breast. Her physician palpates a 2-cm mass beneath the nipple. After delivery at 39 weeks gestation, the mass decreases slightly in size, and the infant is able to breast-feed without any difficulty. This breast lesion is most likely to be a

- ☐ A. Intraductal papilloma
- ☐ B. Lobular carcinoma in situ
- ☐ C. Fibroadenoma
- ☐ D. Medullary carcinoma
- ☐ E. Ductal carcinoma in situ

A 4-year-old boy with periorbital edema presents to the pediatric emergency department for worsening symptoms. His physician treated the patient for allergies, but his symptoms did not improve. On physical examination, the patient is noted to have generalized edema. The physician suspects nephrotic syndrome. Which of the following would support the diagnosis of nephrotic syndrome?

- ☐ A. Heavy proteinuria
- ☐ B. Hypolipidemia
- ☐ C. Hyperproteinemia
- ☐ D. Hypertension
- ☐ E. Hyperalbuminemia

A 60-year-old man with intermittent, cramping abdominal pain for the last 3 days and new onset vomiting for the last 3 hours, has a barium enema that reveals a massively dilated sigmoid colon with a column of barium resembling a "bird's beak." Which of the following is the most likely diagnosis?

- ☐ A. Toxic megacolon
- ☐ B. Achalasia
- ☐ C. Impacted stool
- ☐ D. Volvulus of the sigmoid colon
- ☐ E. Intussusception

Glomerular filtration rate (GFR) and renal blood flow (RBF) will both be increased if

- ☐ A. The efferent and afferent arterioles are both constricted
- ☐ B. The efferent and afferent arterioles are both dilated
- ☐ C. Only the efferent arteriole is constricted
- ☐ D. Only the afferent arteriole is constricted
- ☐ E. The afferent arteriole is constricted and the efferent arteriole is dilated

A 32-year-old male comes to the clinic complaining of an enlarged right testis. Physical exam reveals a 5cm right testicular mass, and serum analysis reveals elevated AFP, normal hCG, and normal PSA. These findings most strongly suggest the presence of which of the following cellular components in the mass?

- ☐ A. Cytotrophoblasts
- ☐ B. Leydig cells
- ☐ C. Seminoma cells
- ☐ D. Yolk sac cells
- ☐ E. Embryonal carcinoma cells

A businessman states that he is happy about losing his job because it gives him more time to spend with his family. Which of the following defense mechanisms is this man using?

- ☐ A. Derealization
- ☐ B. Rationalization
- ☐ C. Displacement
- ☐ D. Projection
- ☐ E. Compensation

Which of the following amino acids gives rise to α -ketoacid that accumulate in the urine in maple syrup disease?

- ☒ A. Valine
- ☐ B. Arginine
- ☐ C. Tryptophan
- ☐ D. Phenylalanine
- ☐ E. Glutamate

Serum test theta has a reference interval from 0 to 5 mg/dL. Changing the reference interval to 0 to 10 mg/dL would do which of the following?

- ☐ A. Increase the specificity
- ☐ B. Increase the sensitivity
- ☐ C. Increase the number of false-negative results
- ☐ D. Decrease the number of false-positive results
- ☐ E. Not alter the sensitivity or specificity

An African-American couple with plans to have a child, communicate no known family history of sickle cell disease, but want to know what the likelihood is that their child will have sickle cell disease. A hemoglobin electrophoresis reveals that the male has no HbS, but the female has a clear HbS band. Knowing that the carrier rate among African-Americans is 1 in 12, the chance that their child will have sickle cell disease is most likely which of the following?

- ☐ A. 1/12
- ☐ B. 1/576
- ☐ D. 1/144
- ☐ E. 1/4

A 28-year-old woman has amenorrhea, after recently beginning a new medication. The most likely medication is

- ☐ A. Buspirone
- ☐ B. Fluoxetine
- ☐ C. Lisinopril
- ☐ D. Haloperidol
- ☐ E. Amitriptyline

An 80 year old female fell while walking up a flight of stairs at her home and fractured the lower third of her humerus. On presentation to the emergency department you suspect a severely damaged radial nerve. What physical signs lead you to suspect such an injury?

- ☐ A. An inability to abduct the fingers
- ☐ B. A loss of wrist extension, leading to wrist drop
- ☐ C. A sensory loss over the ventral aspect of the base of the thumb
- ☐ D. A weakness in pronating the forearm
- ☐ E. An inability to oppose thumb

An increased melting temperature for a molecule of dsDNA results from a high content of

- ☐ A. Cytosine + guanine
- ☐ B. Adenine + guanine
- ☐ C. Cytosine + thymine
- ☐ D. Adenine + cytosine
- ☐ E. Adenine + thymine

20 week sonogram identifies twins, a boy and a girl. The mother has no sign of a bleeding disorder, but her husband has hemophilia A. Both of the mother's parents are in their 60's, and neither parent has a bleeding disorder. However, her father is of Ashkenazi Jewish decent and two of his brothers died at a young age from complications associated with hemophilia A. Which of the following statements about her twins is true?

- ☐ A. The female has a 50% chance of being a carrier, and a 50% chance of expressing the disease; the male has no chance of being a carrier, but a 50% chance of expressing the disease.
- ☐ B. The female has a 50% chance of being a carrier, but no chance of expressing the disease; the male has no chance of being a carrier, but a 50% chance of expressing the disease.
- ☐ C. The female has a 100% chance of being a carrier, but no chance of expressing the disease; the male has a 0% chance of being a carrier or of expressing the disease.
- ☐ D. Both the female and the male have no chance of either being a carrier or expressing the disease.
- ☐ E. The female has a 75% chance of being a carrier, and a 25% chance of expressing the disease; the male cannot be a carrier, but has a 50% chance of expressing the disease.

A research study investigated the relationship between mean blood glucose values in pregestational diabetic women and major fetal malformation. Here are the results: The odds ratio for this study is represented by which of the following equations?

Maternal Mean Plasma Glucose Values			
Major Fetal Malformation	≥ 128 mg/dl	< 128 mg/dl	Totals
Present	5	1	6
Absent	25	150	175
Totals	30	151	181

- ☐ A. 150 divided by 25 = 6
- ☐ B. 5/1 divided by 25/150 = 30
- ☐ C. 25 divided by 5 = 5
- ☐ D. 30 divided by 5 = 6
- ☐ E. 150 divided by 30/5 = 25

An 18 year old male with a 5 year history of type 1 diabetes mellitus presents with symptoms of diabetic ketoacidosis. Which of the following changes would you expect to see in his serum?

- ☐ A. Increased plasma pH
- ☐ B. Increased concentration of plasma HCO_3^-
- ☐ C. Increased arterial pCO_2
- ☐ D. Increased anion gap
- ☐ E. Increased concentration of plasma Na^+

A culture of bacteria sensitive to erythromycin develops an infection from a phage virus that is derived from the lysis of erythromycin-resistant bacteria. The bacterial progeny of the original culture is found to have become resistant to erythromycin. What phenomenon has occurred?

- ☐ A. Transduction
- ☐ B. Transformation
- ☐ C. Conjugation
- ☐ D. Colinearity
- ☐ E. Recombination

A 25-year-old male is admitted to the hospital for an acute right femur fracture that resulted from a motor cross accident. The fracture is initially managed with traction and immobilization. Three days later he becomes confused and tachypneic. A petechial rash is noted over the chest, and his lungs are clear to auscultation. Arterial blood gases show pO_2 of 60, pCO_2 of 35, pH of 7.48. Normals: pO_2 75-105, pCO_2 35-45, pH 7.35-7.45. The most likely diagnosis is

- ☐ A. Nosocomial *Staphylococcus aureus* pneumonia
- ☐ B. Hematoma of chest
- ☐ C. Unilateral pulmonary edema
- ☐ D. Fat embolism
- ☐ E. Pulmonary embolism

Bleeding time is determined by nicking the skin superficially with a scalpel blade and measuring the time required for hemostasis. Bleeding time will be prolonged in a person who

- ☐ A. takes large quantities of aspirin
- ☐ B. takes coumarin derivatives
- ☐ C. cannot absorb vitamin K
- ☐ D. has liver disease
- ☐ E. lacks factor VIII

A 6-year-old girl has experienced ataxia and complained of a constant headache for the past 2 weeks. She is brought to the hospital because of vomiting for the last 24 hours and becomes comatose during the physical exam. A head CT scan reveals the presence of a 5-cm mass in the region of the cerebellar vermis along with the dilation of the cerebral ventricles consistent with a noncommunicating hydrocephalus. Cytologic analysis of the cerebrospinal fluid reveals small cells with a high nucleus to cytoplasm ratio and numerous mitotic figures. Which of the following neoplasms most likely explains these findings?

- ☐ A. Metastatic carcinoma
- ☐ B. Medulloblastoma
- ☐ C. Ependymoma
- ☐ D. Schwannoma
- ☐ E. Glioblastoma multiforme

During a baseball game, a 31-year-old player receives a line drive to the head that fractures his optic canal. Which of the following pairs of structures are most likely to be damaged?

- ☐ A. Ophthalmic artery and ophthalmic vein
- ☐ B. Ophthalmic artery and optic nerve
- ☐ C. Optic nerve and ophthalmic vein
- ☐ D. Ophthalmic vein and ophthalmic nerve
- ☐ E. Ophthalmic nerve and optic nerve

A 25-year-old woman, gravida 3, para 2, at 40 weeks' gestation in active labor was administered morphine analgesia at 7-cm dilation. She progressed rapidly to complete dilation over the next 20 minutes and precipitously delivered a 3500-g female neonate whose APGAR was 5 at 1 minute of life and respiratory effort was poor. Which of the following would be most appropriate to administer to the neonate?

- ☐ A. Normal saline bolus
- ☐ B. Sodium bicarbonate
- ☐ C. Atropine
- ☐ D. Naloxone
- ☐ E. Epinephrine

A urinary stone passed by a previously healthy 32-year-old female is sent for analysis and is found to be a calcium oxalate stone. Urinalysis shows a pH of 7, specific gravity of 1.015, 1 + blood, no protein, no glucose and no ketones. Which of the following underlying conditions does she most likely have?

- ☐ A. Gout
- ☐ B. Idiopathic hypercalciuria
- ☐ C. Primary hyperparathyroidism
- ☐ D. Acute cystitis
- ☐ E. Diabetes mellitus

A 40-year-old construction worker has had a low-volume watery diarrhea for the past 2 months. She now presents with midepigastic pain not relieved by over-the-counter antacid medications. On esophagogastroduodenoscopy, she is found to have multiple duodenal ulcerations. Biopsy for *Helicobacter pylori* is negative, and she is given PPIs to inhibit acid secretion. Three months later, repeat endoscopy reveals that the ulcerations are still present. Which of the following gastrointestinal hormones is most likely to be increased on laboratory testing?

- ☐ A. Vasoactive intestinal polypeptide (VIP)
- ☐ B. Insulin
- ☐ C. Gastrin
- ☐ D. Somatostatin
- ☐ E. Glucagon

A 5-month-old infant is brought to the emergency department with the sudden onset of lethargy, poor feeding, constipation, generalized hypotonia, and ophthalmoplegia. The child is afebrile. According to the mother, the child does not like the infant formula unless it is sweetened. Which of the following is the most likely diagnosis?

- ☐ A. Hypomagnesemia
- ☐ B. Myasthenia gravis
- ☐ C. Infant botulism
- ☐ D. Hypothyroidism
- ☐ E. Wernicke-Korsakow disease

Which of the following statements is characteristic of cytotoxic antitumor agents?

- ☐ A. A set of drugs is chosen for combination chemotherapy because the dose-limiting toxicity of each drug is the same.
- ☐ B. The dose-response curve is shallow.
- ☐ C. The cytotoxic drugs will kill a constant number rather than a constant fraction of the tumor cell population.
- ☐ D. The cell kill is a function of drug concentrations and time of exposure to the drug.
- ☐ E. The therapeutic index is wide.

An 80-year-old woman slips on a skateboard left at the top of a flight of stairs by one of the grandchildren. She falls down the stairs, but maintains consciousness. About 36 hours later, she develops a headache with confusion. When seen in the emergency room, she is still conscious, and there is an occipital scalp contusion. The most likely location for an intracranial hemorrhage in this situation is

- ☐ A. Thalamus
- ☐ B. Subdural
- ☐ C. Subarachnoid
- ☐ D. Basal ganglia
- ☐ E. Epidural

Which of the following symptoms or signs is not caused by portal hypertension?

- ☐ A. Internal Hemorrhoids
- ☐ B. Hematemesis
- ☐ C. Splenomegaly
- ☐ D. Ascites
- ☐ E. Spider telangiectasias of skin

A 6-year old boy comes to the pediatric clinic for the first time with choreoathetoid movements. The physician suspects that the patient has rheumatic fever. In addition to Sydenham's chorea, which of the following is another major criteria for the diagnosis of acute rheumatic fever?

- ☐ A. Erythema migrans
- ☐ B. Increased antistreptolysin O (ASO) titer
- ☐ C. Subcutaneous nodules
- ☐ D. Arthralgia
- ☐ E. Elevated erythrocyte sedimentation rate (ESR)

A laboratory test has a reference mean value of 30 mg/dl and a standard deviation of 2. Which of the following is the range in which 95% of the repeated laboratory determinations would be expected to fall?

- ☐ A. 24 to 36
- ☐ B. 26 to 34
- ☐ C. 28 to 34
- ☐ D. 28 to 32
- ☐ E. 30 to 32

Which of the following structures is the site for absorption of CSF into the venous system?

- ☐ A. Internal jugular vein
- ☐ B. Chorioid plexus
- ☐ C. Subarachnoid trabeculea
- ☐ D. Vertebral venous plexus
- ☐ E. Arachnoid villi

A physician discovers that an 85-year-old woman with hypertension, hyperthyroidism, and NY Class III congestive heart failure, has breast cancer. Her daughter asks the physician not to reveal the cancer finding to her because "it will kill her." With respect to the cancer finding, the physician should do which of the following?

- ☐ A. Tell her immediately
- ☐ B. Determine if telling her will pose a risk to her health
- ☐ C. Tell her with her daughter in the room
- ☐ D. Recommend that her daughter to tell her
- ☐ E. Recommend that a member of a cancer support group to tell her

A 54-year-old nurse passes a ureteral calculus that on analysis is found to be composed of calcium oxalate. Routine serum analysis reveals calcium concentration of 12.2 mg/dL (8.4 - 10.2), a phosphorus level of 3.9 mg/dL (3.0 - 4.5), and an albumin level of 4.6 g/dL (3.5 - 5.5). A chest radiograph reveals a 7.5 cm left hilar lung mass. A chest computed tomography scan demonstrates prominent central necrosis in this mass. Which of the following neoplasms is most likely to be associated with these findings?

- ☐ A. Squamous cell carcinoma
- ☐ B. Large cell carcinoma
- ☐ C. Metastatic melanoma
- ☐ D. Small cell anaplastic carcinoma
- ☐ E. Bronchioloalveolar carcinoma

A 13-year-old girl exhibits paraspinous prominence on her left side when she bends forward. Which of the following is the most likely diagnosis?

- ☐ A. Paget's Disease
- ☐ B. Osteochondroma
- ☐ C. Ankylosing spondylitis
- ☐ D. Idiopathic scoliosis
- ☐ E. Vertebral osteomyelitis

A 60-year-old alcoholic presents at the emergency room with signs of portal hypertension. Which of the following surgical procedures would be the most practical method of shunting portal blood around the liver?

- ☐ A. Connecting the portal vein to the superior vena cava
- ☐ B. Connecting the superior mesenteric vein to the inferior mesenteric vein
- ☐ C. Connecting the superior rectal vein to the superior mesenteric vein
- ☐ D. Connecting the portal vein to the left renal vein
- ☐ E. Connecting the splenic vein to the left renal vein

A newborn infant is found to be cyanotic at 18 hours of age. After a thorough evaluation, it is discovered that the child has a tetralogy of Fallot. Which of the following characteristics primarily determines the prognosis in patients with tetralogy of Fallot?

- ☐ A. Degree of right ventricular hypertrophy
- ☐ B. Overriding aorta
- ☐ C. Degree of pulmonic stenosis
- ☐ D. Size of the ventricular septal defect
- ☐ E. Level of hypoxemia at birth

A forensic pathologist obtained cerebral spinal fluid (CSF) from three cadavers who died shortly before the samples were taken. One of the individuals died from a stroke, the second from a self-inflicted gunshot wound, and the third from an intentional overdose of barbiturates. Which of the following metabolites would most likely be found at the lowest concentration in the cadaver who died from the gunshot wound?

- ☐ A. Glucose
- ☐ B. Acetylcholine
- ☐ C. Serotonin
- ☐ D. Norepinephrine
- ☐ E. GABA

Given a volume of distribution of 40 liters, and clearance of 3 liters per hour, what oral dose of a drug with 100% bioavailability would you administer every 12 hours to maintain the average steady-state plasma concentration at 10 mg/L?

- ☐ A. 400 mg
- ☐ B. 500 mg
- ☐ C. 120 mg
- ☐ D. 200 mg
- ☐ E. 360 mg

A 30-year-old woman begins psychotherapy stating she is both desperate and bored. She reports that for the past five or six years she has experienced periodic anxiety and depression and she has made several suicidal gestures. She also reports a variety of impulsive and self-defeating behaviors and sexual promiscuity. She has abruptly terminated two previous attempts at psychotherapy. In both cases she was enraged at the therapist because he was unwilling to prescribe anxiolytic medications. The most likely diagnosis is

- ☐ A. Dysthymia
- ☐ B. Borderline personality disorder
- ☐ C. Schizotypal personality disorder
- ☐ D. Histrionic personality disorder
- ☐ E. Cyclothymia

A 45-year-old woman on total parenteral nutrition (TPN) develops alopecia, a maculopapular rash around the mouth and eyes, and taste and smell abnormalities most likely due to a deficiency of which of the following nutrients?

- ☐ A. Copper
- ☐ B. Selenium
- ☐ C. Essential fatty acids
- ☐ D. Zinc
- ☐ E. Magnesium

A 40-year-old woman with a total thyroidectomy for a medullary carcinoma of the thyroid is noted to have both carpal spasm when her blood pressure is taken and facial muscle contractions with tapping over the facial nerve. Which of the following laboratory findings would most likely be found in this patient?

	Serum calcium	Serum phosphorus	Serum parathormone (PTH)
(A)	Increased	Decreased	Increased
(B)	Increased	Decreased	Decreased
(C)	Decreased	Increased	Decreased
(D)	Decreased	Decreased	Increased
(E)	Decreased	Increased	Decreased

- ☐ A. Increased Decreased Increased
- ☐ B. Increased Decreased Decreased
- ☐ C. Decreased Increased Decreased
- ☐ D. Decreased Decreased Increased
- ☐ E. Decreased Increased Increased

A 23-year-old man complains of morning back pain present for the past 6 months. The pain improves as the day progresses and when he exercises. Physical examination shows diminished anterior flexion of the lumbar spine, muscle spasms in the lower back, and forward stooping when the patient walks. An x-ray shows bilateral sclerotic changes in the sacroiliac area. Which of the following tests would provide the most useful information?

- ☐ A. Human leukocyte antigen (HLA)-B27
- ☐ B. Serum uric acid
- ☐ C. Erythrocyte sedimentation rate (ESR)
- ☐ D. Serum antinuclear antibody test
- ☐ E. Rheumatoid factor

A 58-year-old man with a history of diabetes mellitus, hyperlipidemia, and hypertension presents with acute onset of right facial weakness and numbness. On examination, his speech and extremity strength and sensation are normal, but he has significant weakness of the right side of the face, including the orbicularis oculi and frontalis muscle. In addition, he complains of roaring in the right ear, and his taste sensation is absent on the right side of the anterior tongue. Which of the following best explains these findings?

- ☐ A. Parotid tumor
- ☐ B. Lacunar stroke of the left internal capsule
- ☐ C. Left middle cerebral artery stroke
- ☐ D. Bell's palsy
- ☐ E. Brain-stem glioma

A child is toilet trained, plays interactive games, gives his first and last name, and is able to copy a cross and a circle but not a square or triangle. He is not able to catch a bounced ball or dress without supervision. Which of the following is the most likely age of this child?

- ☐ A. 5 years old
- ☐ B. 4 years old
- ☐ C. 3 years old
- ☐ D. 2 years old
- ☐ E. 1 year old

The data in the following table was obtained from five inhalational anesthetics. Which of the following agents will provide the most rapid rate of recovery?

	Anesthetic	Blood: Gas	Minimum
		Partition Coefficient	Alveolar Concentration (%)
(A)	Nitrous oxide	0.5	>100
(B)	Desflurane	0.4	7
(C)	Sevoflurane	0.7	3
(D)	Isoflurane	1.4	1.4
(E)	Halothane	2.3	0.8

- ☐ A. Nitrous oxide 0.5 >100
- ☐ B. Desflurane 0.4 7
- ☐ C. Sevoflurane 0.7 3
- ☐ D. Isoflurane 1.4 1.4
- ☐ E. Halothane 2.3 0.8

A gravid-3, para-2 woman at 8 months' gestation presents for anxiousness and palpitations. She has a history of mild hyperthyroidism, and she is found to have lost weight. She has developed a tremor, her resting heart rate is 120 beats/min, and her thyroid gland is noticeably larger than it was at the time of her last office visit. Management of this patient's condition would be best achieved by treatment with which of the following?

- ☐ A. Iodide followed by surgical removal of the gland
- ☐ B. Methimazole
- ☐ C. Propranolol
- ☐ D. Propylthiouracil
- ☐ E. Metoprolol

An increase in arteriolar resistance, without a change in any other component of the cardiovascular system, will produce

- ☐ A. An increase in capillary filtration
- ☐ B. An increase in arterial pressure
- ☐ C. A decrease in afterload
- ☐ D. An increase in preload
- ☐ E. A decrease in total peripheral resistance (TPR)

A 12-year-old girl is on summer vacation with her parents in Connecticut. She presents with fever; generalized lymphadenopathy; and an expanding, erythematous papular rash on the trunk. The left knee is painful and slightly swollen. Which of the following is the most likely diagnosis?

- ☐ A. Lyme disease
- ☐ B. Colorado tick fever
- ☐ C. Babesiosis
- ☐ D. Rocky Mountain spotted fever
- ☐ E. Juvenile rheumatoid arthritis

A patient recently discovered she is human immunodeficiency virus (HIV) positive and now requires preventative medical care. Which of the following vaccination combinations is most appropriate?

- ☐ A. Pneumococcal vaccine; influenza vaccine; Haemophilus influenzae type B (HIB) vaccine; measles, mumps, rubella (MMR) vaccine; and oral polio vaccine (OPV)
- ☐ B. Pneumococcal vaccine, influenza vaccine, HIB vaccine and OPV
- ☐ C. Pneumococcal vaccine, influenza vaccine, HIB vaccine, and MMR vaccine
- ☐ D. Pneumococcal vaccine, MMR vaccine and OPV
- ☐ E. Influenza vaccine, HIB vaccine, MMR vaccine and OPV

Which of the following cancers is responsible for the most deaths in women each year?

- ☐ A. Cervical
- ☐ B. Lung
- ☐ C. Endometrial
- ☐ D. Breast
- ☐ E. Colon

A 40-year-old woman with diabetes mellitus comes to the office complaining of pruritic, whitish, and thick vaginal discharge. Which of the following diagnostic tests is most useful for identifying the cause of this condition?

- ☐ A. Culture
- ☐ B. Potassium hydroxide (KOH) prep
- ☐ C. Saline wet prep
- ☐ D. pH
- ☐ E. Gram's stain

A 65-year-old man presents with a nonproductive cough for a week and generalized malaise. He also has noted some abdominal pain associated with diarrhea for the past few days. His temperature is 100.5°F, and a clinical exam is unremarkable. A chest x-ray shows a left lower lobe infiltrate. His urinalysis shows 50 red blood cells (RBCs), and his BUN and creatinine are both mildly elevated. Which of the following is the most likely cause of his pneumonia?

- ☐ A. *Legionella pneumophila*
- ☐ B. *Staphylococcus aureus*
- ☐ C. *Streptococcus pneumoniae*
- ☐ D. *Pseudomonas aeruginosa*
- ☐ E. *Hemophilis influenzae*

A 3-month-old infant was found dead by his mother late one evening. When she put him in bed only an hour before, he had shown no signs of distress. The baby's term birth had followed an uncomplicated pregnancy, and he had been feeding well and gaining weight normally. What is the medical examiner most likely to find at autopsy?

- ☐ A. Coarctation of the aorta
- ☐ B. Intussusception
- ☐ C. Adrenal neuroblastoma
- ☐ D. Cerebral cytomegalovirus
- ☐ E. No abnormalities

Which of the following conditions is treated with benztropine?

- ☐ A. Huntington's disease
- ☐ B. Parkinsonian disorders
- ☐ C. Tardive dyskinesia
- ☐ D. Alzheimer's
- ☐ E. Normal pressure hydrocephalus

A neonate is found to have the following laboratory findings: a low serum sodium level, a high serum potassium level, and the baby has a metabolic acidosis. Hypotension with cardiovascular collapse occurs within 48 hours of birth. An abdominal ultrasound reveals bilaterally enlarged adrenal glands. Which of the following enzyme deficiency states does the baby probably have?

- ☐ A. Aldosterone synthase
- ☐ B. 21-hydroxylase
- ☐ C. Aromatase
- ☐ D. 11-hydroxylase
- ☐ E. 17(alpha) hydroxylase

Which of the following statements about ergots is correct?

- ☐ A. Bromocriptine is used to inhibit lactation because it is a dopamine agonist
- ☐ B. Ergot is a contaminant of German wine
- ☐ C. Methysergide is used to induce labor
- ☐ D. Ergotamine is a potent arterial dilator
- ☐ E. Ropinirole is an ergot dopamine agonist used in Parkinson's

Which of the following statements regarding opiate action is correct?

- ☐ A. Its expectorant action is caused by stimulation of mucus production
- ☐ B. It acts centrally to suppress the medullary cough center
- ☐ C. It triggers a vagal reflex to suppress cough
- ☐ D. It can cause diarrhea
- ☐ E. Over time tolerance will develop to opioid induced miosis

A 58-year-old, obese, G2P2 female has an episode of vaginal bleeding, producing only about 5 mL of blood. There is no enlargement of the uterus and on speculum exam the cervix has a normal appearance. A pap smear reveals cells consistent with adenocarcinoma. Which of the following conditions most likely contributed to this malignancy?

- ☐ A. Leiomyoma
- ☐ B. Adenomyosis
- ☐ C. Chronic endometritis
- ☐ D. Endometrial hyperplasia
- ☐ E. Human papillomavirus (HPV) infection

Phenylketonuria (PKU) is thought to be a genetic disease caused by

- ☐ A. Tyrosinase deficiency
- ☐ B. Deficiency of alpha-ketoacid dehydrogenase
- ☐ C. Deficiency of a phenylalanine transport system
- ☐ D. An excess of tyrosine
- ☐ E. Deficiency of a hydroxylase involved in an amino acid conversion

A 85-year-old male complains of hip and back pain, headaches, hearing loss, and tinnitus. On physical exam the skull appears enlarged, with prominent superficial veins. There is marked kyphosis and the bones of the leg appear deformed. Plasma alkaline phosphatase is elevated. A skull x-ray shows sharply demarcated lucencies in the frontal, parietal, and occipital bones. X-rays of the hip show thickening of the pelvic brim. The most likely diagnosis is

- ☐ A. Hypercalcemia
- ☐ B. Multiple myeloma
- ☐ C. Paget's disease
- ☐ D. Metastatic bone disease
- ☐ E. Osteitis fibrosa cystica

A 45-year-old male with a blood pressure of 135/95 is evaluated for hypertension. He complains of polyuria and of mild muscle weakness. He is on no diuretics or other blood pressure medication, and he does not eat licorice. On physical exam the cardiac apical impulse is displaced to the sixth intercostal space. There is no sign of congestive heart failure and no edema.

Laboratory:

Na⁺ 147mg/dL (135 - 145)

K⁺ 2.3 mg/dL (3.5 - 5)

Cl⁻ 112 mg/dL (95 - 105)

HCO₃ 27 mg/dL (22 - 28)

The first step in the diagnosis would be

- ☐ A. obtain renal angiogram
- ☐ B. measure plasma renin and aldosterone
- ☐ C. 24-hour urine for cortisol
- ☐ D. urinary metanephrine
- ☐ E. serum TSH

Which of the following phrases best describes the antibiotic action of clavulanic acid?

- ☐ A. Inhibits β -lactamases
- ☐ B. Inhibits penicillin-binding-proteins
- ☐ C. Inhibits dihydropteroate synthetase
- ☐ D. Inhibits transpeptidases
- ☐ E. Inhibits bacterial gyrase

During the synthesis of mature collagen fibers, which of the following steps occurs within the fibroblasts?

- ☐ A. hydroxylation of leucine residues
- ☐ B. formation of covalent cross-links between molecules
- ☐ C. hydrolysis of procollagen to form collagen
- ☐ D. glycosylation of proline residues
- ☐ E. formation of triple helix

A mother reports that her previously healthy 11-month-old has not had a bowel movement in 4 days. She also has noticed also that the baby's abdomen is distended, and on examination, the abdomen is very tender. Which of the following lesions best accounts for these findings?

- ☐ A. Meckel diverticulum
- ☐ B. Intussusception
- ☐ C. Pyloric stenosis
- ☐ D. Duodenal atresia
- ☐ E. Hirschsprung disease

Given the following table, which of the following options reflects the study group in a cohort study design?

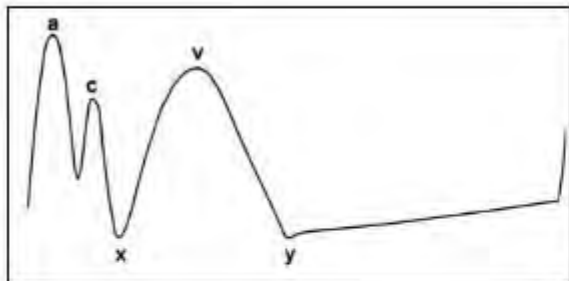
	Disease Present (D+)	Disease Absent (D-)
Exposed	2	4
Nonexposed	6	8

- ☐ A. 6
- ☐ B. 8
- ☐ C. 14
- ☐ D. 10
- ☐ E. 12

Which of the following vitamins is the precursor of CoA?

- ☐ A. Pyridoxamine
- ☐ B. Thiamine
- ☐ C. Riboflavin
- ☐ D. Pantothenic acid
- ☐ E. Niacin

The diagram below represents the pressure wave form of a jugular pulse. Which of the following statements represents waveform y?



- ☐ A. Atrial contraction
- ☐ B. Rapid filling of the right ventricle
- ☐ C. Atrial tricuspid bulge during systole
- ☐ D. Systolic ventricular emptying
- ☐ E. Rising atrial pressure during systole

A 40-year-old male was involved in a skiing accident, which resulted in a fracture of the left femur. He received blood transfusion for hypovolemia resulting from trauma and underwent open reduction internal fixation. Despite enoxaparin prophylaxis and the use of SCDs, he developed deep venous thrombosis. Complete anticoagulation with enoxaparin and warfarin was commenced. Thereafter, enoxaparin was discontinued and the patient was maintained on warfarin. The patient was discharged from the hospital on warfarin and followed up in an orthopaedic clinic. During his follow-up visit, adequacy of anticoagulation therapy would be best determined by which of the following?

- ☐ A. Vitamin K level
- ☐ B. International normalized ratio (INR)
- ☐ C. Prothrombin time (PT)
- ☐ D. Factor Xa
- ☐ E. Platelet count

A 65-year-old male is brought to the ICU with pneumonia and septic shock. Administration of epinephrine in this patient results in a severe decrease in blood pressure. Which of the following drugs might the patient have previously taken that could account for this unexpected effect?

- ☐ A. Prazosin
- ☐ B. Guanethidine
- ☐ C. Cocaine
- ☐ D. Atropine
- ☐ E. Tamsulosin

A 60-year-old female with a history of hypothyroidism, multi-joint osteoarthritis, diabetes mellitus and hypertension developed pain in the left shoulder and arm, that she attributed to her arthritis. She took some ibuprofen, and over the next several hours, developed shortness of breath, which persisted for several days. On the third day, she visited her doctor, who ordered creatine kinase (CK) and troponin I levels. The total CK activity was within reference range, but the troponin level was elevated. She was admitted to the hospital, where she continued to experience dyspnea over the next 48 hours. One day after admission, the patient suffered from a life-ending arrhythmia secondary to cardiac arrest. Autopsy reveals a large transmural myocardial infarct (MI) with rupture of the heart and acute hemopericardium. Which of the following statements is supported by the clinical and autopsy data?

- ☐ A. A second acute MI most likely occurred during her hospital stay, because myocardial rupture usually occurs within several hours of the development of transmural MI.
- ☐ B. The patient most probably did not develop MI until 5 days after the episode of chest pain.
- ☐ C. The normal CK level and elevated troponin level obtained on day 3 are consistent with an acute MI occurring on the day the patient developed shoulder pain.
- ☐ D. The normal CK level obtained on day 3 excludes the possibility of MI in the preceding 72 hours.
- ☐ E. A CK-MB fraction determination would have been a much more sensitive way to detect acute MI than total CK level.

A 45-year-old woman is brought to the emergency department by her friend after she threatened to commit suicide. She has no prior history of suicide attempts. During your examination you find her to be agitated and emotionally labile, however. She now states that she is no longer suicidal. Which of the following most significantly increases her risk for completing suicide?

- ☐ A. Recent sexual conflicts
- ☐ B. A history of childhood sexual abuse
- ☐ C. Schizophrenia
- ☐ D. Dissatisfaction with her job
- ☐ E. Marriage to an abusive spouse

Drug W causes an increase in blood pressure and a decrease in heart rate when administered intravenously. If an antagonist at ganglionic nicotinic receptors is administered prior to drug W, the consequence is an increase in blood pressure and an increase in heart rate. Drug W most likely is

- ☐ A. Isoproterenol
- ☐ B. Propranolol
- ☐ C. Curare
- ☐ D. Norepinephrine
- ☐ E. Terbutaline

A 28-year-old man presents to your office with the sudden onset of weakness in his left arm. He was recently arrested and released on charges of spousal abuse. Yesterday he gave several guns to a friend of his because he "didn't trust himself with them." Mental status examination reveals a peculiar calmness and the lack of concern about his weakness. What is the most likely diagnosis?

- ☐ A. Acute stress disorder
- ☐ B. Specific phobia
- ☐ C. Obsessive-compulsive disorder
- ☐ D. Conversion disorder
- ☐ E. Somatozation disorder

A 50-year-old man complains of a 4-month history of memory impairment. Mental status examination reveals an alert and attentive patient with average vocabulary. He is able to recall one out of three objects after five minutes and has noticeable difficulties with reasoning and abstraction. Which of the following is the most likely diagnosis?

- ☐ A. Mild mental retardation
- ☐ B. Major depressive disorder
- ☐ C. Delirium
- ☐ D. Dysthymia
- ☐ E. Dementia

A young man riding a bull was thrown off and sustained an injury to the lateral aspect of his left knee. Following the injury, he was unable to evert his foot effectively. This patient most likely experienced trauma to which of the following?

- ☐ A. Peroneal nerve
- ☐ B. Anterior tibial nerve
- ☐ C. Sciatic nerve
- ☐ D. Posterior tibial nerve
- ☐ E. Obturator nerve

At birth, a female neonate is noted to be small for 39-weeks' gestational age. Physical examination reveals microcephaly, short palpebral fissures, and maxillary hypoplasia. Which of the following conditions is most likely to lead to these findings?

- ☐ A. Fetal alcohol syndrome
- ☐ B. Trisomy 18
- ☐ C. Congenital rubella
- ☐ D. Placenta previa
- ☐ E. Trisomy 21

A 30-year-old female has a long history of recurring, mild upper respiratory tract infections and has also had diarrhea for most of her life, although not severe enough to have malabsorption with weight loss. After an episode of trauma with blood loss, she receives a blood transfusion that is complicated by an anaphylactic reaction. Which of the following underlying conditions best explains these findings?

- ☐ A. Cystic fibrosis
- ☐ B. Selective IgA deficiency
- ☐ C. HIV infection
- ☐ D. Wegener's granulomatosis
- ☐ E. Wiskott-Aldrich syndrome

A 6-year-old boy recently diagnosed with juvenile rheumatoid arthritis is seen by his pediatrician with symptoms of headache, dizziness, tinnitus, sweating, and hyperventilation for 2 days. Which of the following drugs may be associated with these adverse effects?

- ☐ A. Ketorolac
- ☐ B. Acetaminophen
- ☐ C. Naproxen sodium
- ☐ D. Aspirin
- ☐ E. None of the above

A 16-year-old girl experiences a tonic-clonic seizure with loss of consciousness at school. The seizure continues as she is being transported to the emergency department. Shortly after arriving at the hospital, the patient suffers another seizure. Which of the following is the drug of choice for treatment of this patient?

- ☐ A. Valproic acid
- ☐ B. Carbamazepine
- ☐ C. Diazepam
- ☐ D. Ethosuximide
- ☐ E. Gabapentine

An 10-month-old infant presents with a 2-day history of a mild upper respiratory tract infection, with serous nasal discharge, temperature of 39°C, increased fussiness, and decreased appetite. Examination reveals a tachypneic infant with audible wheezing, nasal flaring, and use of the accessory muscles, as well as intercostal and subcostal retractions. Expiratory wheezes are present. Which of the following is the most likely diagnosis?

- ☐ A. Bronchiolitis
- ☐ B. Croup
- ☐ C. Cystic fibrosis
- ☐ D. Asthma
- ☐ E. Acute epiglottitis

A 60-year-old woman who has a history of Graves disease and who had radical mastectomy for invasive ductal carcinoma of the breast one year previously now develops polyuria, nocturia, and excessive thirst. Laboratory values are as follows:

Serum sodium 149 meq/L (135-145)

Serum potassium 3.6 meq/L (3.5-5.0)

Serum calcium: 9.5 mg/dL (8.5-10)

Blood glucose: 110 mg/dL (80-120)

Blood urea nitrogen: 30 mg/dL (7-18)

Urine osmolality: 150 mOsm/kg (275-295)

The most likely diagnosis is

- ☐ A. Diabetes insipidus
- ☐ B. Renal glycosuria
- ☐ C. Psychogenic polydipsia
- ☐ D. Inappropriate antidiuretic hormone syndrome
- ☐ E. Hyperthyroidism

A 2-year-old child that was breast fed for the first year of life, presents now with failure to thrive. Hepatomegaly and ecchymoses of the skin are found on physical examination. The child exhibits convulsions, and the blood glucose is found to be only 40 mg/dL. The serum lactate level is elevated. Liver biopsy shows cells filled with clear vacuoles that stain positively for glycogen. Which of the following conditions best explains these findings?

- ☐ A. Pompe disease
- ☐ B. Tay-Sachs disease
- ☐ C. McArdle syndrome
- ☐ D. Hurler syndrome
- ☐ E. Von Gierke disease

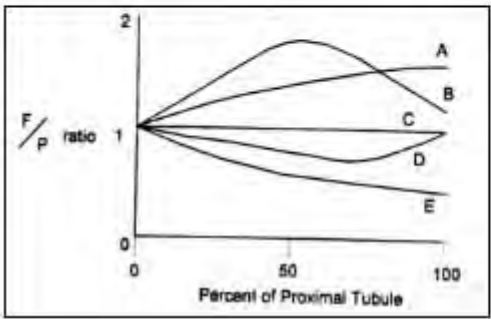
A 65-year-old, slender Asian woman has a family history of osteoporosis. She had a complete hysterectomy 25 years ago for dysfunctional uterine bleeding. She takes adequate amounts of vitamin D and calcium, walks two miles daily, and takes daily oral estrogen replacement without progesterone. Bone densitometry studies indicate that she is above the fracture threshold. By which of the following mechanisms is the estrogen most likely preventing osteoporosis in this patient?

- ☐ A. Enhanced bone resorption
- ☐ B. Enhanced formation and decreased resorption
- ☐ C. Decreased bone resorption
- ☐ D. Enhanced bone formation
- ☐ E. Decreased bone formation

A 45-year-old female presents with complaints of increasing fatigue and lethargy for 3 months. As part of a workup by her physician, she is found to be anemic and to have a serum creatinine level of 5.8 mg/dL (0.6-1.2 mg/dL). Urinalysis shows 2+ proteinuria, and the ANA test result is negative. A renal biopsy reveals hypercellular glomeruli, and electron-dense deposits along the lamina densa of the glomerular basement membrane. Which of the following forms of glomerulonephritis is most likely?

- ☐ A. Membranous glomerulonephritis
- ☐ B. Chronic glomerulonephritis
- ☐ C. Postinfectious glomerulonephritis
- ☐ D. Rapidly progressive glomerulonephritis
- ☐ E. Membranoproliferative glomerulonephritis

The figure below shows the F/P ratio (the ratio of the concentration of a substance in filtrate compared with the concentration of the substance in the plasma) for five freely filterable substances at various points along the proximal tubule. Which graph represents the concentration of inulin?



- ☐ A. A
- ☐ B. B
- ☐ C. C
- ☐ D. D
- ☐ E. E

Which of the following statements about prostaglandin biosyntheses is true?

- ☐ A. Glucocorticoids inhibit both thromboxane and leukotriene synthesis
- ☐ B. Aspirin inhibits both thromboxane and leukotriene syntheses
- ☐ C. Lipoxygenase converts arachidonic acid to endoperoxides
- ☐ D. Sodium salicylate causes irreversible acylation of prostaglandin H synthase
- ☐ E. Zileuton inhibits cyclooxygenase

A 19-year-old previously healthy male suddenly collapses while at a rock concert with his friends. He is taken to the hospital, requiring resuscitation with defibrillation en route to establish a normal cardiac rhythm. On admission, vital signs show his temperature to be 41°C, respirations 38, heart rate 115/min, and blood pressure 170/95 mm Hg. His pupils are dilated. Which of the following drugs is most likely responsible for these findings?

- ☐ A. Cocaine
- ☐ B. Marijuana
- ☐ C. Ethanol
- ☐ D. Heroin
- ☐ E. Phencyclidine

Drug F is converted to an inactive metabolite in the liver by a P-450-catalyzed biotransformation. Another drug, isoniazid, inactivates this particular P-450. If isoniazid and drug F are administered simultaneously, isoniazid will

- ☐ A. Shift the dose-response curve of drug F and decrease the plasma half-life
- ☐ B. Decrease the half-life for plasma levels of drug F
- ☐ C. Shift the dose-response curve of drug F to the right
- ☐ D. Not affect the dose-response curve
- ☐ E. None of the above

What effects would you see with a lesion to the ulnar nerve at the brachial plexus?

- ☐ A. inability to extend fingers
- ☐ B. inability to initiate arm abduction
- ☐ C. inability to abduct fingers
- ☐ D. inability to oppose thumb
- ☐ E. inability to flex elbow

A 45-year-old male comes to the emergency room complaining of severe upper abdominal pain which he states has been present for 3 days. You take a full history and note that he is on multiple medications. On physical exam you notice that his epigastric region is extremely tender to palpation, there is a ecchymosis on his left flank, and his breathing is mildly increased. You check multiple labs, but your first one to return is the basic metabolic panel which only reveals hypocalcemia. Which of the following drugs is responsible for this patient's symptoms?

- ☐ A. saquinavir
- ☐ B. nevirapine
- ☐ C. zidovudine
- ☐ D. delavirdine
- ☐ E. stavudine

The chart below demonstrates the properties of drugs D-G as determined from dose-response curves. Drugs D-G produce the same therapeutic effect via the same mechanism, but each drug has a unique safety profile. Which drug is most potent?

			Certain
	ED ₅₀	Therapeutic	Safety
Drug	(mg)	Index	Factor
D	1.0	7	2.1
E	5.0	9	4.0
F	33.0	15	3.0
G	0.5	4	2.8

- A. Drug D
- B. Drug E
- C. Drug F
- D. Drug G**

You answered:

A

Explanation:

The answer is (D) Drug G The ED₅₀, medication dose that is effective in 50% of the population. A lower ED₅₀ indicates a more potent drug. Drug G is the most potent drug because it has the lowest ED₅₀. Conversely, Drug F is the least potent drug because it has the highest ED₅₀.

Categories:

Pharmacokinetics & Autonomics

Ventricular tachycardia associated with an acute myocardial infarction is best managed by intravenous administration of which of the following medications?

- A. Digitalis
- B. Quinidine
- C. Lidocaine
- D. Atropine
- E. Dobutamine

You answered:

A

Explanation:

The answer is (C) Lidocaine. Lidocaine is a class IB Na^+ -channel blocker and is the best agent for management of ventricular tachycardia associated with acute myocardial infarction. Dobutamine is a sympathomimetic that stimulates beta-1 receptors which could induce tachycardia. It is the drug of choice for cardiogenic shock because of its positive inotropic effects. Digitalis is a cardiac glycoside that works by the following mechanism: inhibition of the Na^+/K^+ ATPase \rightarrow less extracellular sodium \rightarrow less activity of the $\text{Na}^+/\text{Ca}^{2+}$ counter-transporter \rightarrow more intracellular Ca^{2+} \rightarrow more contractility/inotropy. Digitalis (or Digoxin) is indicated for improving contractility in heart failure patients and slowing the resting heart rate in patients with atrial fibrillation. Quinidine is a Class IA antiarrhythmic that could potentially induce a tachyarrhythmia. Atropine is a cholinergic antagonist at muscarinic receptors that also can cause tachycardia and would not be indicated in this patient with "V-tach."

Categories:

Cardiovascular

A 4-year-old child with sickle cell disease presents to the emergency department with a temperature of 40°C (104°F). The mother states that the child has been lethargic for the past 5 hours. Physical exam reveals nuchal rigidity with positive Kernig sign and Brudzinski sign. The patient has had no known sick contacts, takes no medication, and immunizations are up to date. Analysis of the cerebrospinal fluid would most likely reveal which of the following pathogens?

- A. *Listeria monocytogenes*
- B. *Escherichia coli*
- C. Group A β -hemolytic streptococcus
- D. Group B streptococcus
- E. ***Streptococcus pneumoniae***

You answered:

A

Explanation:

The answer is (E) *Strep. pneumoniae*. Because of asplenia and impaired immunity against encapsulated organisms, patients with sickle cell disease are at increased risk for developing severe pneumococcal disease. Because of this, polysaccharide pneumococcal vaccine should be administered to all asplenic children 2 years of age and older; although it may not be as effective in children under the age of 5 years as it is in older individuals. Even if a child with sickle cell disease is given prophylactic antibiotics, there is still a chance that he will develop pneumococcal meningitis before 5 years of age. *Escherichia coli*, *Listeria monocytogenes*, and group B streptococcus are more common pathogens in newborns. Group A β -hemolytic streptococci generally does not cause meningitis but rather infections of the respiratory tract, skin, soft tissues, and blood.

Categories:

Microbiology

A 10-year-old girl has pain in the right hip region. A radiograph reveals changes of osteomyelitis involving the femoral metaphysis, with extension to the subperiosteal region and abscess formation. Which of the following organisms is most often responsible for this clinical picture?

- A. *Neisseria gonorrhoeae*
- B. *Staphylococcus aureus***
- C. *Haemophilus influenza*
- D. *Salmonella*
- E. Group B *Streptococcus*

You answered:

A

Explanation:

The answer is (B) *Staph. aureus*. In a pediatric population with no history of previous illness, *S. aureus* is the most common causative organism of pyogenic osteomyelitis. This type of infection may originate from hematogenous dissemination from infection at another location. *Salmonella* osteomyelitis is more common in patients with sickle cell anemia. *H. influenzae* and group B streptococcal infections are most common in the neonatal period. In sexually active patients, gonorrhea may occasionally disseminate and involve the bones (osteomyelitis) or joints (septic arthritis).

Categories:

Microbiology

Which of the following statements would best describe a patient in the well-fed state?

- A. Acetoacetate is the major fuel for muscle
- B. Glucose transport into adipose tissue is decreased
- C. NADPH production by the hexose monophosphate shunt is decreased
- D. Glucose is the major fuel used by the brain**
- E. Amino acids are utilized for glucose production

You answered:

A

Explanation:

The answer is (D) Glucose is the major fuel used by the brain. Glucose is the major fuel for the brain in the well-fed state. The brain requires a continuous supply of glucose at all times. In the fasting or starving state, however, the brain is capable of obtaining approximately 75 percent of its energy from circulating ketone bodies. In the well-fed state, ketone bodies such as acetoacetate and 3-hydroxybutyrate are low and are not the major fuel for muscle. Circulating amino acids are utilized for protein synthesis rather than glucose production. Liver production of NADPH is high since it is needed for fatty acid synthesis. Glucose is actively transported into all cells, including adipocytes, which require it to form glucose-3-phosphate for esterifying fatty acids into triacylglyceride.

Categories:

Biochemistry & Cell Biology

A 23-year-old woman without any prior history of psychiatric problems has a 4-week episode of insomnia, increased psychomotor activity, and impulsivity. She has no history of substance abuse or general medical conditions. Prior to this episode, she has worked steadily as a realtor. She has no history of depressive episodes, and there have been no recent emotional stressors. Mental status examination reveals a well-oriented female with pressured speech and labile mood, but no psychotic symptoms. Laboratory studies including TSH are normal. Which of the following conditions is most suggested by this presentation?

A. Pheochromocytoma

B. Mania

C. Depression

D. Anxiety

E. Hyperthyroidism

You answered:

A

Explanation:

The answer is (B) Mania. Mania is characterized by an irritable, elevated, or euphoric mood, Distractibility, Irresponsibility and poor judgement, Grandiosity, Flight of ideas, increased psychomotor Activity/Agitation, decreased need for Sleep, and Talkativeness or pressured speech (DIG FAST). A manic episode is all that is required to make the diagnosis of bipolar disorder; however, mania may also be induced by certain drugs including psychostimulants or corticosteroids. Hyperthyroidism is excluded as an answer choice since the TSH normal would be low in a hyperthyroid state. None of this patient's symptoms are suggestive of anxiety or depression. Pheochromocytoma is a catecholamine adrenal tumor of adults and usually these patients present with the classic triad of episodic hypertension, headache, and generalized sweating but may also have palpitations/tachycardia and/or panic attack symptoms.

Atropine is an effective antidote to poisoning by which toxic agent?

- A. Carbaryl
- B. Parathion**
- C. Methanol
- D. Chlorophenothane (DDT)
- E. Naphthalene

You answered:

A

Explanation:

The answer is (B) Parathion. Parathion is an organophosphate insecticide that inhibits acetylcholinesterase (AChE). If administered early in organophosphate poisonings, atropine reverses the muscarinic cholinergic effects. Also indicated in organophosphate poisoning is pralidoxime which regenerates AChE. Carbaryl is carbamate insecticides that inhibits AChE, but this inhibition is reversed spontaneously and does not require atropine. The toxicities of methanol, chlorophenothane (DDT), and naphthalene are unrelated to acetylcholine action.

Categories:

Pharmacokinetics & Autonomics

An 8-year-old girl has multiple painful, swollen lymph nodes in her left inguinal region that have worsened over the past 4 days. An inguinal lymph node biopsy reveals large germinal centers containing numerous mitotic figures and numerous neutrophils about the follicles and in the sinuses. The most likely cause for these histologic changes is

A. Acute lymphadenitis

B. Acute lymphoblastic leukemia

C. Sarcoidosis

D. Follicular lymphoma

E. Cat scratch disease

You answered:

A

Explanation:

The answer is (A) Acute Lymphadenitis. Acute, painful enlargement of lymph nodes suggests a reactive condition such as an acute bacterial infection. This type of acute lymphadenitis is very common in children. Insidious, painless lymph node enlargement is more indicative of a neoplastic process such as lymphoma or leukemia. Follicular lymphomas which do not occur in children are neoplasms of B cells that efface the normal architecture of the nodes. Sarcoidosis is a chronic granulomatous disease characterized by the formation of noncaseating granulomas. Cat scratch disease may produce sarcoid-like granulomas with stellate abscesses.

Categories:

Microbiology

Which of the following changes would increase membrane excitability by the greatest amount?

- A. Decreasing extracellular hydrogen ion
- B. Increasing extracellular sodium
- C. Increasing extracellular potassium
- D. Decreasing extracellular chloride
- E. Decreasing extracellular calcium

You answered:

A

Explanation:

The answer is (E) Decreasing extracellular calcium. Membrane excitability is related to how easily sodium channels open when the cell is depolarized. The activation of sodium channels (the opening of the m gate) is determined in part by the extracellular calcium concentration. When extracellular calcium is lowered, the m gate can open at more negative membrane potentials which translates to a more easily excitable membrane. Increasing extracellular potassium will bring the membrane closer to threshold and thus may make it more excitable; however, its main effect is to cause the inactivation of sodium channels by the closing of the h gates. This inactivation of sodium channels makes the cell membrane less excitable.

Categories:

Neurology

A motorcycle accident victim has lost abduction in his right arm. Which of the following parts of the brachial plexus has been damaged?

- A. Lower trunk and medial cord
- B. Middle trunk and posterior cord
- C. Middle trunk and lateral cord
- D. Lower trunk and lateral cord
- E. Upper trunk and posterior cord

You answered:

A

Explanation:

The answer is (E) Upper trunk and posterior cord The abductors of the arm are the deltoid and supraspinatus muscles. The deltoid is innervated by the axillary nerve, which arises from the posterior cord of the brachial plexus. The supraspinatus is innervated by the suprascapular nerve, which arises from the upper trunk of the brachial plexus.

Categories:

Neurology

As the uterine artery passes from the anterior division of the internal iliac artery to the uterus, it crosses a structure that is sometimes mistakenly ligated during hysterectomy. This structure is the

- A. Ovarian ligament
- B. Ovarian artery
- C. Ureter
- D. Mesovarium
- E. Round ligament of the uterus

You answered:

A

Explanation:

The ureter runs under the uterine artery near the cervix. Thus, the ureter is sometimes mistakenly ligated during pelvic surgery.

Categories:

Reproduction

Serum test theta has a reference interval from 0 to 5 mg/dL. Changing the reference interval to 0 to 10 mg/dL would do which of the following?

- A. Increase the specificity
- B. Increase the sensitivity**
- C. Increase the number of false-negative results
- D. Decrease the number of false-positive results
- E. Not alter the sensitivity or specificity

You answered:

A

Explanation:

Widening the reference interval of a test (0-5mg/dL to 0-10mg/dL) increases the test's sensitivity, because there will be fewer false negatives (choice C) in this range. However, increasing sensitivity automatically decreases specificity (choice A) by increasing the number of false positives (choice D). This relationship underscores the principle that there is always a trade-off when increasing either sensitivity or specificity. Increasing one always decreases the other, so they would never remain unaltered (choice E).

Categories:

Behavioral Science

In the second trimester of pregnancy, a 30-year-old woman discovers a lump in her left breast. Her physician palpates a 2-cm mass beneath the nipple. After delivery at 39 weeks gestation, the mass decreases slightly in size, and the infant is able to breast-feed without any difficulty. This breast lesion is most likely to be a

- A. Intraductal papilloma
- B. Lobular carcinoma in situ
- C. Fibroadenoma
- D. Medullary carcinoma
- E. Ductal carcinoma in situ

You answered:

A

Explanation:

Fibroadenomas are common, and they may enlarge in pregnancy or late in each menstrual cycle. Most intraductal papillomas are smaller than 1 cm, and they are not influenced by hormonal changes. Phyllodes tumors are uncommon, and they tend to be larger than 4 cm. Lobular carcinoma in situ (LCIS) is typically an ill-defined lesion without a mass effect. Medullary carcinomas tend to be large, and they comprise only about 1% of all breast carcinomas.

Categories:

Reproduction

A 4-year-old boy with periorbital edema presents to the pediatric emergency department for worsening symptoms. His physician treated the patient for allergies, but his symptoms did not improve. On physical examination, the patient is noted to have generalized edema. The physician suspects nephrotic syndrome. Which of the following would support the diagnosis of nephrotic syndrome?

- A. Heavy proteinuria
- B. Hypolipidemia
- C. Hyperproteinemia
- D. Hypertension
- E. Hyperalbuminemia

You answered:

A

Explanation:

Nephrotic syndrome is characterized by hypoproteinemia [serum albumin < 40 mg/dL], edema, and hyperlipidemia [predominately triglycerides and cholesterol] [not hypolipidemia (choice B)]. Hypertension (choice D) is rarely seen in nephrotic syndrome. Diarrhea is also commonly seen. Patients with nephrotic syndrome have hypoalbuminemia, not hyperalbuminemia (choice E).

Categories:

Renal

An African-American couple with plans to have a child, communicate no known family history of sickle cell disease, but want to know what the likelihood is that their child will have sickle cell disease. A hemoglobin electrophoresis reveals that the male has no HbS, but the female has a clear HbS band. Knowing that the carrier rate among African-Americans is 1 in 12, the chance that their child will have sickle cell disease is most likely which of the following?

- A. 1/12
- B. 1/576
- D. 1/144
- E. 1/4

You answered:

A

Explanation:

Patients with sickle cell disease are homozygous for HbS. Because the male has no HbS on hemoglobin electrophoresis, the only way their child could inherit two HbS genes is if the father's sperm cells underwent a new mutation, which is an extremely unlikely event. Therefore, their child does not have a chance of inheriting the disease. However, there is a 1/4 chance that their child would be a carrier, having only the sickle cell trait (choice E). If there is no information about the family history, the chance of a child having the disease is 1/576 (choice B). The reason for this is that the odds that two carriers will meet is $1/12 \times 1/12$ or 1/144 (choice D), and the odds that two carriers will have an infected child is 1/4. Therefore, the odds that two African-Americans, who know nothing about their family histories or hemoglobin (Hgb) patterns will have a child with the disease is $1/144 \times 1/4$ or 1/576.

Categories:

Biochemistry & Cell Biology , Hematology

A 60-year-old man with intermittent, cramping abdominal pain for the last 3 days and new onset vomiting for the last 3 hours, has a barium enema that reveals a massively dilated sigmoid colon with a column of barium resembling a "bird's beak." Which of the following is the most likely diagnosis?

A. Toxic megacolon

B. Achalasia

C. Impacted stool

D. Volvulus of the sigmoid colon

E. Intussusception

You answered:

A

Explanation:

The patient has volvulus, or twisting of the bowel around the mesenteric root. It is most common in the sigmoid colon (65%) and is most often seen in the elderly population. Obstruction and strangulation with infarction are potential sequelae. Clinical signs include colicky abdominal pain with persistence and pain between spasms, abdominal distention, and vomiting. Barium studies reveal a "bird's beak" or "ace of spades" appearance, with the lumen of the bowel tapering toward the volvulus. A volvulus can frequently be decompressed with a flexible colonoscope, but it often recurs. If it cannot be decompressed, then surgery should be performed with removal of the redundant bowel.

Categories:

Gastroenterology

Glomerular filtration rate (GFR) and renal blood flow (RBF) will both be increased if

- A. The efferent and afferent arterioles are both constricted
- B. The efferent and afferent arterioles are both dilated**
- C. Only the efferent arteriole is constricted
- D. Only the afferent arteriole is constricted
- E. The afferent arteriole is constricted and the efferent arteriole is dilated

You answered:

A

Explanation:

Categories:

Renal

A 28-year-old woman has amenorrhea, after recently beginning a new medication. The most likely medication is

- A. Buspirone
- B. Fluoxetine
- C. Lisinopril
- D. Haloperidol**
- E. Amitriptyline

You answered:

A

Explanation:

Hypogonadism with amenorrhea is the most common presentation in a premenopausal woman with hyperprolactinemia, and medications are a common cause of hyperprolactinemia. Medications are important in the differential diagnosis of hyperprolactinemia. A common drug that causes increased prolactin with possible amenorrhea and galactorrhea is haloperidol, a dopamine antagonist. Lisinopril has no effect on prolactin levels. The antidepressants fluoxetine and amitriptyline and the anxiolytic buspirone may cause small changes in prolactin levels, but rarely enough to cause clinical syndrome.

Categories:

Endocrine

A businessman states that he is happy about losing his job because it gives him more time to spend with his family. Which of the following defense mechanisms is this man using?

- A. Derealization
- B. Rationalization**
- C. Displacement
- D. Projection
- E. Compensation

You answered:

A

Explanation:

Rationalization refers to the distortion of reality so that the actual act or event seems to be desirable. This defense mechanism is often used when an individual cannot accept the implications of a particular outcome of events.

Categories:

Psychiatry & Psychology

Which of the following amino acids gives rise to α -ketoacid that accumulate in the urine in maple syrup disease?

A. Valine

B. Arginine

C. Tryptophan

D. Phenylalanine

E. Glutamate

You answered:

A

Explanation:

Maple syrup urine disease results from a deficiency of the α -ketoacid dehydrogenases responsible for oxidation of the α -keto analogues of the branched-chain amino acids (leucine, isoleucine, and valine). Consequently, these α -ketoacids accumulate in blood, urine, and spinal fluid and produce the biochemical abnormalities and sweet odor characteristic of this disorder. The disease is transmitted as an autosomal recessive trait and clinical features include mental and physical retardation.

Categories:

Biochemistry & Cell Biology

A 6-year-old girl has experienced ataxia and complained of a constant headache for the past 2 weeks. She is brought to the hospital because of vomiting for the last 24 hours and becomes comatose during the physical exam. A head CT scan reveals the presence of a 5-cm mass in the region of the cerebellar vermis along with the dilation of the cerebral ventricles consistent with a noncommunicating hydrocephalus. Cytologic analysis of the cerebrospinal fluid reveals small cells with a high nucleus to cytoplasm ratio and numerous mitotic figures. Which of the following neoplasms most likely explains these findings?

- A. Metastatic carcinoma
- B. Medulloblastoma**
- C. Ependymoma
- D. Schwannoma
- E. Glioblastoma multiforme

You answered:

A

Explanation:

The clinical features, location, and cytologic findings all point the diagnosis of medulloblastoma. Most intracranial neoplasms in children are located in the posterior fossa. The medulloblastoma, one of the "blue cell tumors" of childhood, arises in the midline, and the cells can seed into the CSF. Schwannomas are benign neoplasms that do not seed the CSF. Ependymomas can be seen in children, but they typically arise in the ventricles. A glioblastoma multiforme could also seed the CSF, but this neoplasm is seen in adults. Metastatic disease is uncommon in children.

Categories:

Neurology

A 32-year-old male comes to the clinic complaining of an enlarged right testis. Physical exam reveals a 5cm right testicular mass, and serum analysis reveals elevated AFP, normal hCG, and normal PSA. These findings most strongly suggest the presence of which of the following cellular components in the mass?

- A. Cytotrophoblasts
- B. Leydig cells
- C. Seminoma cells
- D. Yolk sac cells**
- E. Embryonal carcinoma cells

You answered:

A

Explanation:

AFP is a product of yolk sac cells that can be demonstrated by immunohistochemistry. Pure yolk sac tumors are rare in adults, but yolk sac components are common in mixed nonseminomatous tumors. Cytotrophoblasts do not produce a serum marker, but they may be present in a choriocarcinoma along with syncytiotrophoblasts that do produce hCG. Embryonal carcinoma cells by themselves do not produce any specific product. However, embryonal carcinoma cells are common in nonseminomatous and are often mixed with other cell types.

Categories:

Reproduction

A newborn infant is found to be cyanotic at 18 hours of age. After a thorough evaluation, it is discovered that the child has a tetralogy of Fallot. Which of the following characteristics primarily determines the prognosis in patients with tetralogy of Fallot?

- A. Degree of right ventricular hypertrophy
- B. Overriding aorta
- C. Degree of pulmonic stenosis
- D. Size of the ventricular septal defect
- E. Level of hypoxemia at birth

You answered:

A

Explanation:

Classic tetralogy of Fallot consists of pulmonic stenosis, overriding aorta, right ventricular hypertrophy, and ventricular septal defect. Fallot's tetralogy is the most common congenital heart disease with cyanosis, although cyanosis may not be present at birth. Typical chest x-ray shows a boot-shaped heart with diminished pulmonary vascular markings. Treatment is surgical. Prognosis depends on the degree of pulmonic stenosis, which determines the degrees of hypoxemia (choice E) and right ventricular hypertrophy (choice A). Overriding aorta (choice B) and the size of the ventricular septal defect (choice D) do not significantly relate to the prognosis.

Categories:

Cardiovascular , Embryology & Congenital Disorders

An 80 year old female fell while walking up a flight of stairs at her home and fractured the lower third of her humerus. On presentation to the emergency department you suspect a severely damaged radial nerve. What physical signs lead you to suspect such an injury?

- A. An inability to abduct the fingers
- B. A loss of wrist extension, leading to wrist drop**
- C. A sensory loss over the ventral aspect of the base of the thumb
- D. A weakness in pronating the forearm
- E. An inability to oppose thumb

You answered:

A

Explanation:

Injury to the radial nerve will result in loss of wrist extension, leading to wrist drop. The pronator teres, pronator quadratus, and opponens pollicis muscles, as well as skin over the ventral aspect of the thumb, are innervated by the median nerve. The dorsal interosseous muscles, which act to abduct the fingers, are innervated by the ulnar nerve.

Categories:

Neurology

20 week sonogram identifies twins, a boy and a girl. The mother has no sign of a bleeding disorder, but her husband has hemophilia A. Both of the mother's parents are in their 60's, and neither parent has a bleeding disorder. However, her father is of Ashkenazi Jewish descent and two of his brothers died at a young age from complications associated with hemophilia A. Which of the following statements about her twins is true?

- A. The female has a 50% chance of being a carrier, and a 50% chance of expressing the disease; the male has no chance of being a carrier, but a 50% chance of expressing the disease.
- B. The female has a 50% chance of being a carrier, but no chance of expressing the disease; the male has no chance of being a carrier, but a 50% chance of expressing the disease.
- C. The female has a 100% chance of being a carrier, but no chance of expressing the disease; the male has a 0% chance of being a carrier or of expressing the disease.
- D. Both the female and the male have no chance of either being a carrier or expressing the disease.
- E. The female has a 75% chance of being a carrier, and a 25% chance of expressing the disease; the male cannot be a carrier, but has a 50% chance of expressing the disease.

You answered:

A

Explanation:

Hemophilia A is a X-linked recessive disease. Normally, males inherit an X chromosome from their mother and a Y chromosome from their father, while females inherit one X chromosome from their mother and the other from their father. Therefore, a male cannot pass an X-linked disease to a son, but has a 100% chance of passing the defective gene to a daughter. There is no reason to suspect that the mother has a defective gene. Despite the fact that her father's brothers had hemophilia, her father is healthy and male. Therefore, his only X chromosome is normal. Therefore, the female twin will be a carrier, but she will not express the disease. The male twin will not be a carrier or express the disease. If the mother was a carrier and the father did not have the disease, the male would have a 50% chance of expressing the disease, but no chance of being a carrier. The female would have a 50% chance of being a carrier, but no chance of expressing the disease (choice B). If the father had the disease and the mother was a carrier, the female would have a 50% chance of being a carrier (one normal gene from the mother and one defective gene from the father) and a 50% chance of expressing the disease (one defective gene from each parent). The male would have a 50% chance of expressing the disease, but no chance of being a carrier (choice A). If neither of the parents had the disease, and both of the mother's X chromosomes were normal, neither the female nor the male would have a chance of being a carrier or expressing the disease (choice D). (Choice E) is mathematically impossible, because the mother only has two X chromosomes. If neither is affected, she is normal. If one is affected, she has a 50% chance of passing it on. If both are affected, (an exceedingly rare situation), she has the disease herself. In order to have a 75% chance of being a carrier, she would have to have three X-chromosomes, two of which would have to be abnormal.

Categories:

Biochemistry & Cell Biology , Hematology

During a baseball game, a 31-year-old player receives a line drive to the head that fractures his optic canal. Which of the following pairs of structures are most likely to be damaged?

- A. Ophthalmic artery and ophthalmic vein
- B. Ophthalmic artery and optic nerve**
- C. Optic nerve and ophthalmic vein
- D. Ophthalmic vein and ophthalmic nerve
- E. Ophthalmic nerve and optic nerve

You answered:

A

Explanation:

The optic canal transmits the optic nerve, ophthalmic artery, and the central vein of the retina. The ophthalmic nerve and the ophthalmic vein pass through the superior orbital fissure.

Categories:

Neurology

20 week sonogram identifies twins, a boy and a girl. The mother has no sign of a bleeding disorder, but her husband has hemophilia A. Both of the mother's parents are in their 60's, and neither parent has a bleeding disorder. However, her father is of Ashkenazi Jewish descent and two of his brothers died at a young age from complications associated with hemophilia A. Which of the following statements about her twins is true?

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- C. The female has a 100% chance of being a carrier, but no chance of expressing the disease; the male has a 0% chance of being a carrier or of expressing the disease.
- D. Both the female and the male have no chance of either being a carrier or expressing the disease.
- E. The female has a 75% chance of being a carrier, and a 25% chance of expressing the disease; the male cannot be a carrier, but has a 50% chance of expressing the disease.

You answered:

A

Explanation:

Hemophilia A is a X-linked recessive disease. Normally, males inherit an X chromosome from their mother and a Y chromosome from their father, while females inherit one X chromosome from their mother and the other from their father. Therefore, a male cannot pass an X-linked disease to a son, but has a 100% chance of passing the defective gene to a daughter. There is no reason to suspect that the mother has a defective gene. Despite the fact that her father's brothers had hemophilia, her father is healthy and male. Therefore, his only X chromosome is normal. Therefore, the female twin will be a carrier, but she will not express the disease. The male twin will not be a carrier or express the disease. If the mother was a carrier and the father did not have the disease, the male would have a 50% chance of expressing the disease, but no chance of being a carrier. The female would have a 50% chance of being a carrier, but no chance of expressing the disease (choice B). If the father had the disease and the mother was a carrier, the female would have a 50% chance of being a carrier (one normal gene from the mother and one defective gene from the father) and a 50% chance of expressing the disease (one defective gene from each parent). The male would have a 50% chance of expressing the disease, but no chance of being a carrier (choice A). If neither of the parents had the disease, and both of the mother's X chromosomes were normal, neither the female nor the male would have a chance of being a carrier or expressing the disease (choice D). (Choice E) is mathematically impossible, because the mother only has two X chromosomes. If neither is affected, she is normal. If one is affected, she has a 50% chance of passing it on. If both are affected, (an exceedingly rare situation), she has the disease herself. In order to have a 75% chance of being a carrier, she would have to have three X-chromosomes, two of which would have to be abnormal.

Categories:

Biochemistry & Cell Biology , Hematology

Maternal Mean Plasma Glucose Values

Major Fetal Malformation	≥ 128 mg/dl	< 128 mg/dl	Totals
Present	5	1	6
Absent	25	150	175
Totals	30	151	181

A. 150 divided by 25 = 6

B. 5/1 divided by 25/150 = 30

C. 25 divided by 5 = 5

D. 30 divided by 5 = 6

E. 150 divided by 30/5 = 25

You answered:

A

Explanation:

The odds ratio is a method of estimating relative risk in case-control studies. It is calculated by dividing the odds of exposure among the diseased group (numerator) by the odds of exposure among the disease-free group (the denominator). Using the data from the table, the number is 5/1 and the denominator is 25/150.

Categories:

Behavioral Science

A urinary stone passed by a previously healthy 32-year-old female is sent for analysis and is found to be a calcium oxalate stone. Urinalysis shows a pH of 7, specific gravity of 1.015, 1 + blood, no protein, no glucose and no ketones. Which of the following underlying conditions does she most likely have?

- A. Gout
- B. Idiopathic hypercalciuria**
- C. Primary hyperparathyroidism
- D. Acute cystitis
- E. Diabetes mellitus

You answered:

A

Explanation:

The most common urinary tract stones are made up of calcium oxalate. Approximately 50% of patients with calcium oxalate stones have increased excretion of calcium without hypercalcemia. The basis of hypercalciuria is not clear. Most uric acid stones are formed in acidic urine and are not related to gout. It is thought that these patients have an unexplained tendency to excrete acidic urine. At low pH, uric acid is insoluble and stones form. Infections can predispose to the formation of magnesium ammonium phosphate stones. Diabetes mellitus is not known as a cause for urinary tract lithiasis, although infections are more common. Hyperparathyroidism predisposes to formation of stones with calcium, but few patients with stones have this condition.

Categories:

Renal

An 18 year old male with a 5 year history of type 1 diabetes mellitus presents with symptoms of diabetic ketoacidosis. Which of the following changes would you expect to see in his serum?

- A. Increased plasma pH
- B. Increased concentration of plasma HCO_3^-
- C. Increased arterial pCO_2
- D. Increased anion gap**
- E. Increased concentration of plasma Na^+

You answered:

A

Explanation:

In a diabetic ketoacidosis there is an increased production of acetoacetic and β -hydroxybutyric acids, which leads to an increase in plasma concentration of hydrogen ion. These fixed acids are buffered by all body buffers, but mainly by bicarbonate. The concentration of plasma HCO_3^- is therefore below normal. The consumption of bicarbonate and the addition of the anions of the fixed acids to the plasma cause an elevation of the anion gap. The anion gap is equal to plasma $[\text{Na}^+] - (\text{plasma } [\text{HCO}_3^-] + \text{plasma } [\text{Cl}^-])$, and is normally about 12 to 15 meq/L. The acidosis would stimulate the carotid body chemoreceptors (and eventually the central chemoreceptors) to cause an increase in ventilation, which decreases arterial Pco_2 .

Categories:

Renal , Endocrine

A culture of bacteria sensitive to erythromycin develops an infection from a phage virus that is derived from the lysis of erythromycin-resistant bacteria. The bacterial progeny of the original culture is found to have become resistant to erythromycin. What phenomenon has occurred?

A. Transduction

B. Transformation

C. Conjugation

D. Colinearity

E. Recombination

You answered:

A

Explanation:

Transduction involves the transfer of a portion of DNA from one bacterium to the chromosome of another bacterium by means of a viral infection. Conjugation is the transfer DNA to an acceptor. Colinearity defines the relationship between genes and proteins such that the sequence of amino acids in proteins is a result of the sequence of base triplets in template genes. Recombination is simply the exchange of sequences between two molecules of DNA. Transformation results when exogenous DNA fragments are incorporated into the chromosomes of another organism.

Categories:

Microbiology

Bleeding time is determined by nicking the skin superficially with a scalpel blade and measuring the time required for hemostasis. Bleeding time will be prolonged in a person who

A. takes large quantities of aspirin

B. takes coumarin derivatives

C. cannot absorb vitamin K

D. has liver disease

E. lacks factor VIII

You answered:

A

Explanation:

Hemostasis following blood vessel injury depends on (1) vascular spasm, (2) formation of a platelet plug, and (3) clot formation. When injury to a vessel produces on a small defect, the platelet plug itself can cause hemostasis. This is the basis for the bleeding time that is employed clinically to distinguish hemostatic abnormalities caused by platelet abnormalities from those caused by coagulation defects. Aspirin diminishes platelet aggregation by inhibiting cyclooxygenase, an enzyme required for generation of thromboxanes, which promote platelet aggregation. All the other situations described in the question are associated with coagulation deficiency. Persons thus affected would have a normal bleeding time, but would present clinically with delayed posttraumatic bleeding caused by their inability to form an effective clot to reinforce the platelet plug.

Categories:

Hematology

A 25-year-old male is admitted to the hospital for an acute right femur fracture that resulted from a motor cross accident. The fracture is initially managed with traction and immobilization. Three days later he becomes confused and tachypneic. A petechial rash is noted over the chest, and his lungs are clear to auscultation. Arterial blood gases show pO₂ of 60, pCO₂ of 35, pH of 7.48. Normals: pO₂ 75-105, pCO₂ 35-45, pH 7.35-7.45. The most likely diagnosis is

- A. Nosocomial *Staphylococcus aureus* pneumonia
- B. Hematoma of chest
- C. Unilateral pulmonary edema
- D. Fat embolism**
- E. Pulmonary embolism

You answered:

A

Explanation:

Because the clinical signs of neurologic deterioration and petechial rash have occurred in the setting of fracture and hypoxia, fat embolism is the most likely diagnosis. This process occurs when neutral fat is introduced into the venous circulation after bone trauma or fracture. The latent period is 12 to 36 hours, usually earlier than a pulmonary embolus would occur after trauma.

Categories:

Pulmonary , Cardiovascular

A 6-year old boy comes to the pediatric clinic for the first time with choreoathetoid movements. The physician suspects that the patient has rheumatic fever. In addition to Sydenham's chorea, which of the following is another major criteria for the diagnosis of acute rheumatic fever?

- A. Erythema migrans
- B. Increased antistreptolysin O (ASO) titer
- C. Subcutaneous nodules
- D. Arthralgia
- E. Elevated erythrocyte sedimentation rate (ESR)

You answered:

A

Explanation:

Discriminating clinical findings (Jones criteria) are used to make the diagnosis of acute rheumatic fever. The major criteria are carditis, polyarthritis, chorea, subcutaneous nodules, and a rash (erythema marginatum). Minor criteria include fever; arthralgia (choice D); previous rheumatic fever; elevated acute phase reactants, such as erythrocyte sedimentation rate [ESR] (choice E) and C-reactive protein (CRP); and a prolonged P-R interval. Previously, two major or one major and two minor criteria plus evidence of a recent streptococcal infection, such as an elevated antistreptolysin O (ASO) titer (choice B), were required to consider the diagnosis of acute rheumatic fever, because Sydenham's chorea may be the only symptom of rheumatic fever.

Categories:

Cardiovascular

A 25-year-old woman, gravida 3, para 2, at 40 weeks' gestation in active labor was administered morphine analgesia at 7-cm dilation. She progressed rapidly to complete dilation over the next 20 minutes and precipitously delivered a 3500-g female neonate whose APGAR was 5 at 1 minute of life and respiratory effort was poor. Which of the following would be most appropriate to administer to the neonate?

- A. Normal saline bolus
- B. Sodium bicarbonate
- C. Atropine
- D. Naloxone**
- E. Epinephrine

You answered:

A

Explanation:

Respiratory depression due to maternal narcotics is unusual with the increased use of conduction anesthesia. However, treatment using naloxone is highly effective. Sodium bicarbonate (choice B), epinephrine (choice E), normal saline bolus (choice A), and are all useful in neonatal resuscitation, but only naloxone is specific for reversal of narcotic depression. Atropine (choice C) is seldom if ever used as a part of neonatal resuscitation.

Categories:

Neurology

A 40-year-old construction worker has had a low-volume watery diarrhea for the past 2 months. She now presents with midepigastic pain not relieved by over-the-counter antacid medications. On esophagogastroduodenoscopy, she is found to have multiple duodenal ulcerations. Biopsy for *Helicobacter pylori* is negative, and she is given PPIs to inhibit acid secretion. Three months later, repeat endoscopy reveals that the ulcerations are still present. Which of the following gastrointestinal hormones is most likely to be increased on laboratory testing?

- A. Vasoactive intestinal polypeptide (VIP)
- B. Insulin
- C. Gastrin
- D. Somatostatin
- E. Glucagon

You answered:

A

Explanation:

This patient has the Zollinger-Ellison syndrome, with one or more islet cell adenomas of the pancreas secreting gastrin. This secretion leads to intractable peptic ulcer disease, with multiple duodenal or gastric ulcerations. Islet cell tumors may secrete a variety of hormonally active compounds. Glucagonomas and somatostatinomas may produce a syndrome with a mild diabetes mellitus. VIPomas may be associated with marked watery diarrhea, hypokalemia, and achlorhydria.

Categories:

Gastroenterology

A laboratory test has a reference mean value of 30 mg/dl and a standard deviation of 2. Which of the following is the range in which 95% of the repeated laboratory determinations would be expected to fall?

A. 24 to 36

B. 26 to 34

C. 28 to 34

D. 28 to 32

E. 30 to 32

You answered:

A

Explanation:

Assuming a normal distribution, the ± 2 standard deviations describes the range in which it can be expected that 95% of repeated observations or determinations would fall. In the scenario described (with a mean of 30 and a standard deviation of 2), the normal range would be 30 ± 4 , or 26 to 34. (Choices A, C, D, and E) are incorrect ranges.

Categories:

Behavioral Science

A 5-month-old infant is brought to the emergency department with the sudden onset of lethargy, poor feeding, constipation, generalized hypotonia, and ophthalmoplegia. The child is afebrile. According to the mother, the child does not like the infant formula unless it is sweetened. Which of the following is the most likely diagnosis?

- A. Hypomagnesemia
- B. Myasthenia gravis
- C. Infant botulism**
- D. Hypothyroidism
- E. Wernicke-Korsakow disease

You answered:

A

Explanation:

Infant botulism usually occurs in infants less than 1 year of age, particularly between 2 and 6 months. It occurs after the ingestion of *Clostridium botulinum* spores, which can be found in honey and corn syrup, as well as in soil and house dust. The course of the disease varies, but progresses quickly. Typically, the child is afebrile and has been previously healthy. The infant becomes constipated and feeds poorly. A weak cry, hypotonia, and loss of head control are then seen. Descending paralysis progresses over hours to days. Ventilatory support may be necessary.

Categories:

Microbiology

Which of the following statements is characteristic of cytotoxic antitumor agents?

- A. A set of drugs is chosen for combination chemotherapy because the dose-limiting toxicity of each drug is the same.
- B. The dose-response curve is shallow.
- C. The cytotoxic drugs will kill a constant number rather than a constant fraction of the tumor cell population.
- D. The cell kill is a function of drug concentrations and time of exposure to the drug.**
- E. The therapeutic index is wide.

You answered:

A

Explanation:

Cell kill is a function of drug concentration and time of exposure. The dose-response curve is usually steep and the therapeutic index is narrow. If the TI is wide, the dose required for significant tumor cell kill is seldom toxic to the host. Antitumor agents kill a constant fraction of the tumor cell population. Drugs are often chosen for use in combination, because they have different dose-limiting toxicities.

Categories:

Oncology, MS, Derm

Which of the following structures is the site for absorption of CSF into the venous system?

- A. Internal jugular vein
- B. Choroid plexus
- C. Subarachnoid trabeculae
- D. Vertebral venous plexus
- E. Arachnoid villi

You answered:

A

Explanation:

Cerebrospinal fluid is produced by the choroid plexuses of the ventricles of the brain, circulates in the subarachnoid space, and is absorbed into the venous system primarily through the arachnoid villi projecting into the cranial dural venous sinuses, particularly the superior sagittal sinus.

Categories:

Neurology

An 80-year-old woman slips on a skateboard left at the top of a flight of stairs by one of the grandchildren. She falls down the stairs, but maintains consciousness. About 36 hours later, she develops a headache with confusion. When seen in the emergency room, she is still conscious, and there is an occipital scalp contusion. The most likely location for an intracranial hemorrhage in this situation is

- A. Thalamus
- B. Subdural**
- C. Subarachnoid
- D. Basal ganglia
- E. Epidural

You answered:

A

Explanation:

She has a subdural hematoma resulting from tearing of the bridging veins beneath the dura. These veins are at risk for tearing with head trauma, particularly in the elderly, in whom some degree of cerebral atrophy may be present, thereby exposing these veins to potential traumatic tearing. Subarachnoid hemorrhage (choice C) could occur in a region of contusions with trauma. Basal ganglia (choice D) and thalamic (choice A) hemorrhages are most often associated with hypertension. Epidural hemorrhages (choice E) are most often preceded by a blow to the head that tears the middle meningeal artery, and there is commonly a "lucid" interval between initial loss of consciousness with the trauma and the later accumulation of blood.

Categories:

Neurology

Which of the following symptoms or signs is not caused by portal hypertension?

- A. Internal Hemorrhoids
- B. Hematemesis
- C. Splenomegaly
- D. Ascites
- E. Spider telangiectasias of skin

You answered:

A

Explanation:

Spider telangiectasias (i.e. angiomas) refer to vascular lesions in the skin characterized by a central, pulsating, dilated arteriole from which small vessels radiate. This lesion results from hyperestrogenism (which also contributes to the testicular atrophy). The failing liver is unable to metabolize estrogens normally. Therefore, spider angiomas are a manifestation of hepatic failure. Ascites, splenomegaly, hemorrhoids, and esophageal varices are all related to portal hypertension, with resultant collateral venous congestion and dilation.

Categories:

Gastroenterology

A physician discovers that an 85-year-old woman with hypertension, hyperthyroidism, and NY Class III congestive heart failure, has breast cancer. Her daughter asks the physician not to reveal the cancer finding to her because "it will kill her." With respect to the cancer finding, the physician should do which of the following?

- A. Tell her immediately
- B. Determine if telling her will pose a risk to her health**
- C. Tell her with her daughter in the room
- D. Recommend that her daughter to tell her
- E. Recommend that a member of a cancer support group to tell her

You answered:

A

Explanation:

Ordinarily, a patient must be provided with all the information about her diagnosis to obtain informed consent for treatment. However, if the physician's medical opinion is that the patient's life or health will be risked if she is informed, information can be withheld. Therefore, prior to telling this patient the diagnosis of breast cancer, the physician should first evaluate whether telling her will pose a risk to her health. Telling her immediately would not be the correct course of action (choice A). The opinion of the patient's relative concerning this matter is not relevant to the physician's decision (choices C and E). A member of a cancer support group does not need to be involved (choice E).

Categories:

Behavioral Science

A 13-year-old girl exhibits paraspinous prominence on her left side when she bends forward. Which of the following is the most likely diagnosis?

- A. Paget's Disease
- B. Osteochondroma
- C. Ankylosing spondylitis
- D. Idiopathic scoliosis**
- E. Vertebral osteomyelitis

You answered:

A

Explanation:

The patient has idiopathic scoliosis. Forward bending is a school screening test for this disorder. This is usually accompanied by a prominent rib hump (paraspinous prominence) on the right cause by an abnormal lateral curvature of the spine. It is most commonly seen in adolescent girls from 10 to 16 years of age. Scoliosis refers to lateral displacement of the spine, while kyphosis refers to forward displacement of the spine.

Categories:

Oncology, MS, Derm

A 45-year-old woman on total parenteral nutrition (TPN) develops alopecia, a maculopapular rash around the mouth and eyes, and taste and smell abnormalities most likely due to a deficiency of which of the following nutrients?

- A. Copper
- B. Selenium
- C. Essential fatty acids
- D. Zinc**
- E. Magnesium

You answered:

A

Explanation:

Zinc deficiency is characterized by alopecia, a maculopapular rash around the mouth and eyes, taste and smell abnormalities, and problems with healing wounds. Essential fatty acid deficiency (choice C) is characterized by an eczematous rash and thrombocytopenia. Selenium deficiency (choice B) produces muscle pain and a type of cardiomyopathy. Magnesium deficiency (choice E) is associated with resistance to activity of parathormone with subsequent hypocalcemia and tetany. Muscle weakness, irritability, delirium, and convulsions are also noted. Alcoholism is the most common cause of hypomagnesemia. Copper deficiency (choice A) is associated with iron deficiency anemia, dissecting aortic aneurysm, and kinky-hair syndrome.

Categories:

Biochemistry & Cell Biology

A 60-year-old alcoholic presents at the emergency room with signs of portal hypertension. Which of the following surgical procedures would be the most practical method of shunting portal blood around the liver?

- A. Connecting the portal vein to the superior vena cava
- B. Connecting the superior mesenteric vein to the inferior mesenteric vein
- C. Connecting the superior rectal vein to the superior mesenteric vein
- D. Connecting the portal vein to the left renal vein
- E. Connecting the splenic vein to the left renal vein

You answered:

A

Explanation:

Portal hypertension can be reduced by diverting blood from the portal to the caval system. This is done by connecting the splenic vein to the left renal vein or by creating a communication between the portal vein and the inferior vena cava.

Categories:

Gastroenterology

Given a volume of distribution of 40 liters, and clearance of 3 liters per hour, what oral dose of a drug with 100% bioavailability would you administer every 12 hours to maintain the average steady-state plasma concentration at 10 mg/L?

- A. 400 mg
- B. 500 mg
- C. 120 mg
- D. 200 mg
- E. 360 mg

You answered:

A

Explanation:

The maintenance dose of a drug is equal to the clearance (CL) multiplied by the desired plasma concentration (desired [drug]plasma). The way to think about this is that the maintenance dose is the dose that will exactly replace the amount of drug lost per unit time (i.e. the elimination rate). By definition, the elimination rate = $CL \times [drug]_{plasma}$. Thus, the maintenance dose also = $CL \times [drug]_{plasma}$. In this case, the maintenance dose = $3 \text{ L/hour} \times 10 \text{ mg/L} = 30 \text{ mg/hr}$. For a dose interval every 12 hours, this is $30 \times 12 \text{ mg} = 360 \text{ mg}$.

Categories:

Pharmacokinetics & Autonomics

	Serum calcium	Serum phosphorus	Serum parathormone (PTH)
(A)	Increased	Decreased	Increased
(B)	Increased	Decreased	Decreased
(C)	Decreased	Increased	Decreased
(D)	Decreased	Decreased	Increased
(E)	Decreased	Increased	Decreased

- A. Increased Decreased Increased
- B. Increased Decreased Decreased
- C. Decreased Increased Decreased
- D. Decreased Decreased Increased
- E. Decreased Increased Increased

You answered:

A

Explanation:

Hypoparathyroidism is most commonly caused by a total thyroidectomy. Patients develop hypocalcemia, hyperphosphatemia, and decreased parathormone (PTH), because PTH normally increases calcium reabsorption in the kidney and decreases the reabsorption of phosphate. Hypocalcemia results in clinical evidence of tetany, such as carpal spasm after pumping up a blood pressure cuff (Trousseau's sign) and facial muscle contractions after tapping on the facial nerve (Chvostek's sign). Decreased Decreased Decreased Increased Decreased Increased Decreased

A 54-year-old nurse passes a ureteral calculus that on analysis is found to be composed of calcium oxalate. Routine serum analysis reveals calcium concentration of 12.2 mg/dL (8.4 - 10.2), a phosphorus level of 3.9 mg/dL (3.0 - 4.5), and a albumin level of 4.6 g/dL (3.5 - 5.5). A chest radiograph reveals a 7.5 cm left hilar lung mass. A chest computed tomography scan demonstrates prominent central necrosis in this mass. Which of the following neoplasms is most likely to be associated with these findings?

A. Squamous cell carcinoma

B. Large cell carcinoma

C. Metastatic melanoma

D. Small cell anaplastic carcinoma

E. Bronchioloalveolar carcinoma

You answered:

A

Explanation:

Most paraneoplastic syndromes involving lung carcinomas are associated with small cell anaplastic (oat cell) carcinomas, but hypercalcemia is one exception. Most commonly, it is caused by squamous cell carcinoma. Metastatic disease can also lead to hypercalcemia when bone metastases are present, but metastases to the lung usually present as multiple masses, not one large mass. Bronchioloalveolar carcinomas are not common and are not often associated with hormone-like factor production. Large cell carcinomas are not commonly the cause for a paraneoplastic syndrome.

Categories:

Oncology, MS, Derm., Pulmonary

A forensic pathologist obtained cerebral spinal fluid (CSF) from three cadavers who died shortly before the samples were taken. One of the individuals died from a stroke, the second from a self-inflicted gunshot wound, and the third from an intentional overdose of barbiturates. Which of the following metabolites would most likely be found at the lowest concentration in the cadaver who died from the gunshot wound?

- A. Glucose
- B. Acetylcholine
- C. Serotonin
- D. Norepinephrine
- E. GABA

You answered:

A

Explanation:

Some studies have shown lower levels of serotonin and its metabolites in the cerebrospinal fluid (CSF) of suicide victims and suicide attempters. Lower levels of CSF serotonin metabolites have been found in postmortem studies of victims of suicide by violent means, but not in victims who die by more passive means, such as drug ingestion. No other biochemical findings [e.g. altered levels of acetylcholine (choice B), norepinephrine (choice D), glucose (choice A), or GABA (choice E)] have been consistently found in such studies. Some investigators believe that these findings provide evidence that a low level of central nervous system (CNS) serotonin activity is casually related to depression.

Categories:

Psychiatry & Psychology

A 23-year-old man complains of morning back pain present for the past 6 months. The pain improves as the day progresses and when he exercises. Physical examination shows diminished anterior flexion of the lumbar spine, muscle spasms in the lower back, and forward stooping when the patient walks. An x-ray shows bilateral sclerotic changes in the sacroiliac area. Which of the following tests would provide the most useful information?

- A. Human leukocyte antigen (HLA)-B27
- B. Serum uric acid
- C. Erythrocyte sedimentation rate (ESR)
- D. Serum antinuclear antibody test
- E. Rheumatoid factor

You answered:

A

Explanation:

Ankylosing spondylitis is a seronegative [negative rheumatoid factor (choice E)], human leukocyte antigen (HLA)-B27-positive (95%) spondyloarthropathy that occurs primarily in young men between 15 and 30 years of age. Characteristic features include an insidious onset of morning stiffness in the lower back that persists for more than three months and improves as the day progresses or when the person exercises. Sclerotic changes in the sacroiliac area are the first radiographic evidence of the disease. Patients have diminished anterior flexion of the spine. Eventually, the vertebral column fuses to produce the classic "bamboo spine." Additional complications include restriction of chest movement and subsequent restrictive-type lung disease, iridocyclitis (25%), aortitis with aortic valve insufficiency (3% - 10%), and reactive amyloidosis. Indomethacin is the drug of choice. The serum antinuclear antibody test (choice D) is negative in ankylosing spondylitis. Gout does not present with lower back pain, so a uric acid level (choice B) is not indicated. The erythrocyte sedimentation rate (ESR) (choice C) is a nonspecific indicator of inflammation that has little clinical usefulness in either diagnosing or following disease activity in patients with joint diseases.

A 30-year-old woman begins psychotherapy stating she is both desperate and bored. She reports that for the past five or six years she has experienced periodic anxiety and depression and she has made several suicidal gestures. She also reports a variety of impulsive and self-defeating behaviors and sexual promiscuity. She has abruptly terminated two previous attempts at psychotherapy. In both cases she was enraged at the therapist because he was unwilling to prescribe anxiolytic medications. The most likely diagnosis is

- A. Dysthymia
- B. Borderline personality disorder**
- C. Schizotypal personality disorder
- D. Histrionic personality disorder
- E. Cyclothymia

You answered:

A

Explanation:

The patient's history and presenting symptoms are classic for the diagnosis of borderline personality disorder. Patients with borderline personalities present with a history of pervasive instability of mood, relationships, and self-image beginning by early adulthood. Their behavior is often impulsive and self-damaging. Their sexuality is chaotic. Sexual orientation may be uncertain and anger is intense and often acted out. Recurrent suicidal gestures are common. The shifts of mood usually last from a few hours to a few days. Patients often describe chronic feelings of boredom and emptiness.

Categories:

Psychiatry & Psychology

A 58-year-old man with a history of diabetes mellitus, hyperlipidemia, and hypertension presents with acute onset of right facial weakness and numbness. On examination, his speech and extremity strength and sensation are normal, but he has significant weakness of the right side of the face, including the orbicularis oculi and frontalis muscle. In addition, he complains of roaring in the right ear, and his taste sensation is absent on the right side of the anterior tongue. Which of the following best explains these findings?

- A. Parotid tumor
- B. Lacunar stroke of the left internal capsule
- C. Left middle cerebral artery stroke
- D. Bell's palsy**
- E. Brain-stem glioma

You answered:

A

Explanation:

Bell's palsy is idiopathic and nearly always acute. All the patient's deficits are referable to the peripheral nervous system, including the loss of taste (chorda tympani branch of the facial nerve) and hyperacusis (branch of the stapedius muscle of the ear). Stroke (choice B and choice C) is unlikely, because of sparing of the rest of the right side of the body and no other central signs. A brain-stem glioma (choice E) and parotid tumor (choice A), although commonly presenting with facial nerve weakness, are unlikely when the acuteness of the event is considered.

Categories:

Neurology

A child is toilet trained, plays interactive games, gives his first and last name, and is able to copy a cross and a circle but not a square or triangle. He is not able to catch a bounced ball or dress without supervision. Which of the following is the most likely age of this child?

- A. 5 years old
- B. 4 years old
- C. 3 years old
- D. 2 years old
- E. 1 year old

You answered:

A

Explanation:

Most 3-year-old children are toilet trained, play interactive games, give their first and last names, and pedal a tricycle. At age 3, most children should be able to copy a circle, and some will be able to copy a cross. A 1-year-old (choice E) would not be able to pedal a tricycle, give his first and last names, or copy a circle or a cross. At age 1, a child should be able to stand momentarily, say "dada," and "mama," and bang two cubes held in his hands. Although, some 2-year-old children (choice D) may be able to accomplish the tasks noted in the scenario, they would not be able to hop on one foot. Most 4-year-old children (choice B) are able to dress without supervision, hop on one foot, and catch a bounced ball. A 5-year-old child (choice A) would be able to copy a triangle.

Categories:

Behavioral Science

Concentration

	Anesthetic	Partition Coefficient	Concentration (%)
(A)	Nitrous oxide	0.5	>100
(B)	Desflurane	0.4	7
(C)	Sevoflurane	0.7	3
(D)	Isoflurane	1.4	1.4
(E)	Halothane	2.3	0.8

A. Nitrous oxide 0.5 >100

B. Desflurane 0.4 7

C. Sevoflurane 0.7 3

D. Isoflurane 1.4 1.4

E. Halothane 2.3 0.8

You answered:

A

Explanation:

With an inhalational anesthetic, both rate of onset and rate of recovery depend on the blood:gas partition coefficient. Anesthetics with low blood:gas partition coefficients are advantageous, because they act rapidly and the time to recover from their effects is short. Thus, recovery from the anesthetic effects of desflurane occurs more rapidly than with any other inhalation anesthetic, including nitrous oxide (choice A), a sevoflurane (choice C), isoflurane (choice D), and halothane (choice E). The minimum alveolar concentration is the percentage of anesthetic in the inspired gas that results in immobility in 50% of a patient population exposed to a noxious stimulus. Minimum alveolar concentration is inversely related to the potency of an anesthetic agent and does not influence the kinetics of anesthetic onset or recovery.

An increase in arteriolar resistance, without a change in any other component of the cardiovascular system, will produce

- A. An increase in capillary filtration
- B. An increase in arterial pressure**
- C. A decrease in afterload
- D. An increase in preload
- E. A decrease in total peripheral resistance (TPR)

You answered:

A

Explanation:

An increase in arteriolar resistance will increase total peripheral resistance (TPR). Arterial pressure = cardiac output \times TPR, so arterial pressure will also increase. Capillary filtration decreases when there is arteriolar constriction, because P_f decreases. Afterload of the heart would be increased in TPR.

Categories:

Cardiovascular

A gravid-3, para-2 woman at 8 months' gestation presents for anxiousness and palpitations. She has a history of mild hyperthyroidism, and she is found to have lost weight. She has developed a tremor, her resting heart rate is 120 beats/min, and her thyroid gland is noticeably larger than it was at the time of her last office visit. Management of this patient's condition would be best achieved by treatment with which of the following?

A. Iodide followed by surgical removal of the gland

B. Methimazole

C. Propranolol

D. Propylthiouracil

E. Metoprolol

You answered:

A

Explanation:

Treatment of hyperthyroidism during pregnancy depends in part of the severity of the disorder. Hyperthyroid females can often tolerate the mild exacerbation of the state that accompanies pregnancy without therapy, and there appears to be no increase in the incidence of fetal loss. If treatment is judged to be required, propylthiouracil is usually preferred over methimazole (choice B), in part because the latter drug enters the fetal circulation more readily and has been reported to cause aplasia cutis. Propylthiouracil also inhibits 5'-deiodinase, decreasing formation of triiodothyronine (T3). The primary objective of drug therapy is to maintain free thyroxine (FT4) and thyroid-stimulating hormone (TSH) at high to normal levels using the lowest dose possible of propylthiouracil. Beta-blockers (choices C and E) should not be ordinarily be given as an adjuvant, because it may cause fetal growth retardation and neonatal respiratory depression. Antithyroid agents carry less risk to the patient and the pregnancy than surgery. In any event, surgery is contraindicated during the third (and first) trimester of pregnancy (choice A).

A 12-year-old girl is on summer vacation with her parents in Connecticut. She presents with fever, generalized lymphadenopathy, and an expanding, erythematous papular rash on the trunk. The left knee is painful and slightly swollen. Which of the following is the most likely diagnosis?

A. Lyme disease

B. Colorado tick fever

C. Babesiosis

D. Rocky Mountain spotted fever

E. Juvenile rheumatoid arthritis

You answered:

A

Explanation:

Lyme disease is caused by *Borrelia burgdorferi*. It is transmitted by the ticks of the *Ixodes* species, and it is endemic in the coastal areas of the Northeast. Lyme disease is characterized by its rash, carditis, arthritis, and meningitis. The rash (erythema chronicum migrans) starts as an erythematous macule or papule at the site of the tick bite. The lesion continues to expand in a ring-like manner, with central clearing. Nonspecific symptoms of headache, fever, and chills accompany this state, which resolves with or without treatment. Disseminated disease occurs in patients after a latent period of weeks to months and can involve the central nervous system (CNS), heart, and musculoskeletal systems. Persistent infection can occur. Treatment consists of tetracycline, penicillin, or erythromycin.

Categories:

Microbiology

Which of the following cancers is responsible for the most deaths in women each year?

- A. Cervical
- B. Lung**
- C. Endometrial
- D. Breast
- E. Colon

You answered:

A

Explanation:

Breast cancer (choice D) is the most common cancer among women. It was the number one cancer killer in women until recently, when it was overtaken by lung cancer. This is most likely due to the increase in cigarette smoking among women. Colon cancer (choice E) is the third most common cancer among women and kills approximately one-half the number of women as lung cancer. Endometrial cancer (choice C) and cervical cancer (choice A) are responsible for less than one half the number of deaths as colon cancer.

Categories:

Oncology, MS, Derm

A patient recently discovered she is human immunodeficiency virus (HIV) positive and now requires preventative medical care. Which of the following vaccination combinations is most appropriate?

- A. Pneumococcal vaccine; influenza vaccine; Haemophilus influenzae type B (HIB) vaccine; measles, mumps, rubella (MMR) vaccine; and oral polio vaccine (OPV)
- B. Pneumococcal vaccine, influenza vaccine, HIB vaccine and OPV
- C. Pneumococcal vaccine, influenza vaccine, HIB vaccine, and MMR vaccine**
- D. Pneumococcal vaccine, MMR vaccine and OPV
- E. Influenza vaccine, HIB vaccine, MMR vaccine and OPV

You answered:

A

Explanation:

The oral polio vaccine (OPV) should not be administered to patients with immunodeficiency virus (HIV) or any severe deficiency, because it is a live vaccine. Therefore, (choice A, B, D, and E) would not be appropriate vaccination schemes. Vaccinations that are recommended for patients with HIV include vaccinations for pneumococcal influenza. Haemophilus influenza type B (HIB), hepatitis B, measles, mumps, rubella, (MMR), tetanus, diphtheria, inactivated polio vaccine, and travel-related vaccines.

Categories:

Microbiology

A 40-year-old woman with diabetes mellitus comes to the office complaining of pruritic, whitish, and thick vaginal discharge. Which of the following diagnostic tests is most useful for identifying the cause of this condition?

- A. Culture
- B. Potassium hydroxide (KOH) prep**
- C. Saline wet prep
- D. pH
- E. Gram's stain

You answered:

A

Explanation:

The symptom history in this diabetic patient, combined with the gross description, is most consistent with a *Candida* vaginitis. Although a wet prep (choice C) can show up the mycelia if they are profuse enough, the potassium hydroxide (KOH) prep that removes the epithelial debris would give the most prompt diagnosis in the simplest way. Gram's stain (choice E) and culture (choice A) are more expensive and time-consuming. A low pH (choice D), while characteristic of *Candida* vaginitis, is not adequate for diagnosis.

Categories:

Microbiology

A 65-year-old man presents with a nonproductive cough for a week and generalized malaise. He also has noted some abdominal pain associated with diarrhea for the past few days. His temperature is 100.5°F, and a clinical exam is unremarkable. A chest x-ray shows a left lower lobe infiltrate. His urinalysis shows 50 red blood cells (RBCs), and his BUN and creatinine are both mildly elevated. Which of the following is the most likely cause of his pneumonia?

A. Legionella pneumophila

B. Staphylococcus aureus

C. Streptococcus pneumoniae

D. Pseudomonas aeruginosa

E. Hemophilis influenzae

You answered:

A

Explanation:

The spectrum of infection with Legionella organisms ranges from asymptomatic seroconversion to Pontiac fever (a flu-like illness) to full-blown pneumonia. Cough is usually nonproductive initially. Malaise, myalgia, and headache are common. The diagnosis of Legionella infection is suggested by extrapulmonary signs and symptoms, including diarrhea, abdominal pain, azotemia, and hematuria.

Categories:

Microbiology

A 3-month-old infant was found dead by his mother late one evening. When she put him in bed only an hour before, he had shown no signs of distress. The baby's term birth had followed an uncomplicated pregnancy, and he had been feeding well and gaining weight normally. What is the medical examiner most likely to find at autopsy?

- A. Coarctation of the aorta
- B. Intussusception
- C. Adrenal neuroblastoma
- D. Cerebral cytomegalovirus
- E. No abnormalities

You answered:

A

Explanation:

The events suggest SIDS. The cause is unknown, and by definition there are no significant gross or microscopic autopsy findings. Infants with congenital anomalies, infections, or intussusception are unlikely to be doing well. Congenital neoplasms are a rare cause for sudden death.

Categories:

Embryology & Congenital Disorders

Which of the following conditions is treated with benztropine?

- A. Huntington's disease
- B. Parkinsonian disorders**
- C. Tardive dyskinesia
- D. Alzheimer's
- E. Normal pressure hydrocephalus

You answered:

A

Explanation:

Benztropine, a cholinergic antagonist, is used to treat parkinsonian disorders. It has no effect on or may exacerbate Alzheimer's, Huntington's disease, or tardive dyskinesia. It has no role in the treatment of normal pressure hydrocephalus.

Categories:

Neurology

A neonate is found to have the following laboratory findings: a low serum sodium level, a high serum potassium level, and the baby has a metabolic acidosis. Hypotension with cardiovascular collapse occurs within 48 hours of birth. An abdominal ultrasound reveals bilaterally enlarged adrenal glands. Which of the following enzyme deficiency states does the baby probably have?

- A. Aldosterone synthase
- B. 21-hydroxylase**
- C. Aromatase
- D. 11-hydroxylase
- E. 17(alpha) hydroxylase

You answered:

A

Explanation:

The 21-hydroxylase deficiency leads to a salt-wasting form of congenital adrenal hyperplasia, because the enzyme deficiency blocks formation of aldosterone and cortisol. The 11-hydroxylase deficiency blocks cortisol and aldosterone production as well, although intermediate metabolites with some glucocorticoid activity are synthesized. Aromatase is involved with conversion of androstenedione to estrone, a side pathway that does not affect cortisol production. The 17 β -hydroxylase deficiency would lead to reduction of cortisol and sex steroid synthesis. Oxidase is the final enzyme in the pathway to aldosterone production.

Categories:

Endocrine

Which of the following statements about ergots is correct?

A. Bromocriptine is used to inhibit lactation because it is a dopamine agonist

B. Ergot is a contaminant of German wine

C. Methysergide is used to induce labor

D. Ergotamine is a potent arterial dilator

E. Ropinirole is an ergot dopamine agonist used in Parkinson's

You answered:

A

Explanation:

Bromocriptine is a potent dopamine agonist. The prolactin-inhibiting factor is likely dopamine. Ergotamine is a potent vasoconstrictor. Methysergide is useful in the prophylaxis of migraine. Ropinirole is a non-ergot dopamine agonist used in Parkinson's therapy.

Categories:

Endocrine , Neurology

A 85-year-old male complains of hip and back pain, headaches, hearing loss, and tinnitus. On physical exam the skull appears enlarged, with prominent superficial veins. There is marked kyphosis and the bones of the leg appear deformed. Plasma alkaline phosphatase is elevated. A skull x-ray shows sharply demarcated lucencies in the frontal, parietal, and occipital bones. X-rays of the hip show thickening of the pelvic brim. The most likely diagnosis is

- A. Hypercalcemia
- B. Multiple myeloma
- C. Paget's disease
- D. Metastatic bone disease
- E. Osteitis fibrosa cystica

You answered:

A

Explanation:

This patient has widespread Paget's disease of bone. Excessive resorption of bone is followed by replacement of normal marrow with dense, trabecular disorganized bone. Hearing loss and tinnitus is due to direct involvement of the ossicles of the inner ear. Plasma alkaline phosphatase levels represent increased bone turnover. Neither myeloma nor metastatic bone disease result in bony deformity such as skull enlargement.

Categories:

Oncology, MS, Derm

Which of the following statements regarding opiate action is correct?

- A. Its expectorant action is caused by stimulation of mucus production
- B. It acts centrally to suppress the medullary cough center**
- C. It triggers a vagal reflex to suppress cough
- D. It can cause diarrhea
- E. Over time tolerance will develop to opioid induced miosis

You answered:

A

Explanation:

Opioids act centrally to decrease the sensitivity of the cough center. They also decrease propulsion in the bowel. Tolerance does not develop to opiate induced miosis and constipation.

Categories:

Neurology

A 58-year-old, obese, G2P2 female has an episode of vaginal bleeding, producing only about 5 mL of blood. There is no enlargement of the uterus and on speculum exam the cervix has a normal appearance. A pap smear reveals cells consistent with adenocarcinoma. Which of the following conditions most likely contributed to this malignancy?

- A. Leiomyoma
- B. Adenomyosis
- C. Chronic endometritis
- D. Endometrial hyperplasia**
- E. Human papillomavirus (HPV) infection

You answered:

A

Explanation:

She has an endometrial carcinoma. Estrogenic stimulation from anovulatory cycles, nulliparity, obesity, and exogenous estrogens (in higher amounts than found in birth control pills) gives rise to endometrial hyperplasia that can progress to endometrial carcinoma if the estrogenic stimulation continues. Endometrial hyperplasia with atypia progress to endometrial cancer in about 25% of cases. Chronic endometritis does not give rise to cancer. HPV infection is associated with squamous epithelial dysplasias and cervical neoplasia. Adenomyosis and leiomyoma are not a risk for endometrial carcinoma.

Categories:

Reproduction

HCO₃ 27 mg/dL (22 – 28)

The first step in the diagnosis would be

- A. obtain renal angiogram
- B. measure plasma renin and aldosterone**
- C. 24-hour urine for cortisol
- D. urinary metanephrine
- E. serum TSH

You answered:

A

Explanation:

The patient has diastolic hypertension with associated hypokalemia. She is not taking diuretics. There is no edema on physical exam. Excessive inappropriate aldosterone production will produce hypertension with hypokalemia syndrome. Hypersecretion of aldosterone increases distal tubular exchange of sodium for potassium with progressive depletion of body potassium. The hypertension is due to increased sodium absorption. Very low plasma renin that fails to increase with appropriate stimulus (such as volume depletion) and hypersecretion of aldosterone suggest the diagnosis of primary hyperaldosteronism. Suppressed renin activity occurs in about 25% of hypertensive patients with essential hypertension. Lack of suppression of aldosterone is also necessary to diagnose primary aldosteronism. High aldosterone levels that are not suppressed by saline loading prove that there is a primary inappropriate secretion of aldosterone.

Categories:

Cardiovascular , Renal

Phenylketonuria (PKU) is thought to be a genetic disease caused by

- A. Tyrosinase deficiency
- B. Deficiency of alpha-ketoacid dehydrogenase
- C. Deficiency of a phenylalanine transport system
- D. An excess of tyrosine
- E. Deficiency of a hydroxylase involved in an amino acid conversion

You answered:

A

Explanation:

Phenylketonuria is thought to result from a genetic deficiency in the enzyme phenylalanine hydroxylase, which converts phenylalanine to tyrosine. This disorder, which results in dementia, seizures, and dermatologic manifestations, is largely preventable by adequate perinatal screening treatment. The treatment consists of a special diet low in phenylalanine.

Categories:

Biochemistry & Cell Biology

Which of the following phrases best describes the antibiotic action of clavulanic acid?

A. Inhibits β -lactamases

B. Inhibits penicillin-binding-proteins

C. Inhibits dihydropteroate synthetase

D. Inhibits transpeptidases

E. Inhibits bacterial gyrase

You answered:

A

Explanation:

Clavulanic acid is administered in combination with penicillins, because of its activity against β -lactamases. It has little antibiotic activity and is not structurally related to folic acid. It has no effect to transpeptidase activity.

Categories:

Microbiology

During the synthesis of mature collagen fibers, which of the following steps occurs within the fibroblasts?

- A. hydroxylation of leucine residues
- B. formation of covalent cross-links between molecules
- C. hydrolysis of procollagen to form collagen
- D. glycosylation of proline residues
- E. formation of triple helix

You answered:

A

Explanation:

The connective tissue fiber collagen is synthesized by fibroblasts. However, because the length of the finished collagen fibers is many times greater than that of the cell of its origin, a portion of its assembly occurs extracellularly. The intracellular formation of the biosynthetic precursor of collagen, procollagen peptides, pro- $\alpha 1(I)$ and pro- $\alpha 2$, occurs in the following steps: (1) polypeptide synthesis, (2) hydroxylation of proline and lysine (not leucine) residues, (3) glycosylation of lysine residues (proline residues are not glycosylated), (4) triple-helix formation, and (5) secretion. Once outside the fibroblasts, procollagen molecules are activated by fibroblast-specific procollagen peptidases. Before specific proteolytic cleavage of procollagen, tropocollagen bundles will not assemble into collagen fibers. Once the collagen fibers are formed, also cross-links between lysine residues and histidine-aldo cross-links are formed. These cross-links covalently bind the collagen chains to one another. The extent and type of cross-linking determines the flexibility and strength of the collagen mass formed.

Categories:

Biochemistry & Cell Biology

A mother reports that her previously healthy 11-month-old has not had a bowel movement in 4 days. She also has noticed also that the baby's abdomen is distended, and on examination, the abdomen is very tender. Which of the following lesions best accounts for these findings?

- A. Meckel diverticulum
- B. Intussusception**
- C. Pyloric stenosis
- D. Duodenal atresia
- E. Hirschsprung disease

You answered:

A

Explanation:

Intussusception occurs when one small segment of small bowel becomes telescoped into the immediately distal segment. This disorder can have a sudden onset in infants and may occur in the absence of an anatomic abnormality. Almost all cases of Meckel diverticulum are asymptomatic, although in some cases functional gastric mucosa is present that can lead to ulceration with bleeding. Duodenal atresia (which typically occurs with other anomalies) and Hirschsprung disease should have clinical manifestations soon after birth. Pyloric stenosis is seen much earlier in life and is characterized by projectile vomiting.

Categories:

Gastroenterology

	Disease Present (D+)	Disease Absent (D-)	
Exposed	2	4	
Nonexposed	6	8	

- A. 6
- B. 8
- C. 14
- D. 10
- E. 12

You answered:

A

Explanation:

The total number exposed (2+4) represents the cohort involved in a prospective study group. In cohort designs, the investigator first identifies a study group of individuals who have common characteristics (cohort). Some of these will be exposed to a proposed risk agent for disease, while another group will not. The two are observed forward in time for the development of disease. The investigator then establishes the extent to which the disease develops in the two groups. The exposed group (2+4) represents the cohort, while the nonexposed group (6+8) (choice C) represents the control. The sum of 2+6 (choice B) represents the retrospective study group, and are studied backward in time-from the point of disease to the point of exposure. Note that in a prospective study, one can determine the incidence of the disease, but this is not possible in the case of a retrospective study. The sum of 6+4 (choice D) has no statistical value, because they represent two diverse groups.

Which of the following vitamins is the precursor of CoA?

A. Pyridoxamine

B. Thiamine

C. Riboflavin

D. Pantothenic acid

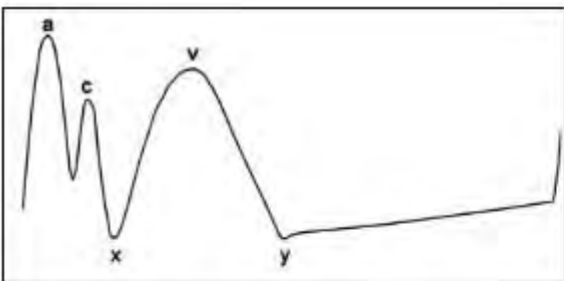
E. Niacin

You answered:

A

Explanation:

Pantothenate is the precursor of CoA, which participates in numerous reactions throughout the metabolic scheme. CoA is a central molecule of metabolism involved in acetylation reactions. Thus, a deficiency of pantothenic acid would have severe consequences. However, there is no documented deficiency state for pantothenate, since this vitamin is common in foodstuffs.



A. Atrial contraction

B. Rapid filling of the right ventricle

C. Atrial tricuspid bulge during systole

D. Systolic ventricular emptying

E. Rising atrial pressure during systole

You answered:

A

Explanation:

The jugular pulse reflects the pressures in the right atrium during the cardiac cycle. The sudden emptying of the atrium as the tricuspid valve opens at the beginning of diastole causes the y descent. It corresponds to the rapid filling phase of the ventricle. The retroversion of the tricuspid valve during ventricular systole and the compression of the jugular vein by the carotid artery produce the c wave. The v wave is caused by the buildup of pressure in the atrium during systole. This buildup of pressure occurs, because the closed tricuspid valve presents the blood returning to the heart from entering the ventricle. The movement of the heart during systole causes the x descent.

A 60-year-old female with a history of hypothyroidism, multi-joint osteoarthritis, diabetes mellitus and hypertension developed pain in the left shoulder and arm, that she attributed to her arthritis. She took some ibuprofen, and over the next several hours, developed shortness of breath, which persisted for several days. On the third day, she visited her doctor, who ordered creatine kinase (CK) and troponin I levels. The total CK activity was within reference range, but the troponin level was elevated. She was admitted to the hospital, where she continued to experience dyspnea over the next 48 hours. One day after admission, the patient suffered from a life-ending arrhythmia secondary to cardiac arrest. Autopsy reveals a large transmural myocardial infarct (MI) with rupture of the heart and acute hemopericardium. Which of the following statements is supported by the clinical and autopsy data?

- A. A second acute MI most likely occurred during her hospital stay, because myocardial rupture usually occurs within several hours of the development of transmural MI.
- B. The patient most probably did not develop MI until 5 days after the episode of chest pain.
- C. The normal CK level and elevated troponin level obtained on day 3 are consistent with an acute MI occurring on the day the patient developed shoulder pain.
- D. The normal CK level obtained on day 3 excludes the possibility of MI in the preceding 72 hours.
- E. A CK-MB fraction determination would have been a much more sensitive way to detect acute MI than total CK level.

You answered:

A

Explanation:

The kinetics of CK, CK-MB, and troponin I elevations after MI are important. Total CK activity begins to rise 2 to 4 hours after an MI, peaks about 24 hours, and returns to normal by 72 hours. Troponin I levels begin to rise about the same time as CK and CK-MB, but remain elevated for 7 to 10 days. Total CK activity is a sensitive marker for myocardial injury in the first 24 to 48 hours. CK-MB offers more specificity, but not more sensitivity. Myocardial rupture occurs 5 to 7 days after myocardial necrosis. This patient developed an MI on the day of the shoulder pain. When he went to the doctor on day 3, the CK levels had returned to normal, but troponin I levels were still elevated. Three days later, he suffered rupture of the infarct.

A. Vitamin K level

B. International normalized ratio (INR)

C. Prothrombin time (PT)

D. Factor Xa

E. Platelet count

You answered:

A

Explanation:

The international normalized ratio (INR) is the best method to ensure that oral anticoagulation is within the therapeutic range, because the prolonged prothrombin time (PT) of the patient over the control varies widely due to the type of thromboplastin used. There are additional factors that can introduce variability in results including methods of sample collection, transport and storage before conducting the test, method used to detect the clot, and source of the plasma for the control. In view of variability, the World Health Organization (WHO) introduced the INR. This is the ratio of the patient's PT to a control PT that would have been derived by a standard method in which a WHO primary human brain thromboplastin is used. In patients with a history of thrombosis, the INR should be maintained between 2.0 and 3.0. The PT is prolonged when there is a decrease in fibrinogen, factor V, or vitamin K dependent factors (i.e. II, VII, X). The PT is unaffected by a fall in factor X and proteins C and S. Thus, measuring PT (choice B) is inaccurate. Measuring the level of vitamin K (choice A) does not address the issue. Vitamin K is usually assessed by indirect means (i.e. by assessing the activity of vitamin K-dependent factors VII, X, and II using the PT). Establishing the platelet count (choice E) is inappropriate, because warfarin is not an antiplatelet agent. Bleeding time (choice D) is not a test of coagulation. Rather, it tests the ability of the blood vessels to constrict and the platelets to form a hemostatic plug. Problems with vasoconstriction or a fall in the platelet count will result in a prolonged bleeding time. Factor Xa can be used to measure the effectiveness of enoxaparin although it is rarely necessary.

A 65-year-old male is brought to the ICU with pneumonia and septic shock. Administration of epinephrine in this patient results in a severe decrease in blood pressure. Which of the following drugs might the patient have previously taken that could account for this unexpected effect?

- A. Prazosin
- B. Guanethidine
- C. Cocaine
- D. Atropine
- E. Tamsulosin

You answered:

A

Explanation:

Epinephrine is an agonist at alpha-1, alpha-2, beta-1, and beta-2 receptors. When given with an alpha-1 antagonist such as prazosin, the vasoconstriction effect of epinephrine on alpha-1 receptors is negated, and the vasodilation caused by beta-1 stimulation is unmasked.

Categories:

Pharmacokinetics & Autonomics

A 45-year-old woman is brought to the emergency department by her friend after she threatened to commit suicide. She has no prior history of suicide attempts. During your examination you find her to be agitated and emotionally labile, however. She now states that she is no longer suicidal. Which of the following most significantly increases her risk for completing suicide?

- A. Recent sexual conflicts
- B. A history of childhood sexual abuse
- C. Schizophrenia**
- D. Dissatisfaction with her job
- E. Marriage to an abusive spouse

You answered:

A

Explanation:

Schizophrenia is a very significant risk factor for suicide. Other serious risk factors include feelings of hopelessness, substance abuse, social isolation, and old age. A history of sexual abuse (choice B), job dissatisfaction (choice D), abusive relationships (choice E), and sexual conflicts (choice A) are not as closely associated with an increased risk for suicide.

Categories:

Psychiatry & Psychology

Drug W causes an increase in blood pressure and a decrease in heart rate when administered intravenously. If an antagonist at ganglionic nicotinic receptors is administered prior to drug W, the consequence is an increase in blood pressure and an increase in heart rate. Drug W most likely is

- A. Isoproterenol
- B. Propranolol
- C. Curare
- D. Norepinephrine**
- E. Terbutaline

You answered:

A

Explanation:

In the absence of a nicotinic receptor antagonist, norepinephrine may result in a reflex baroreceptor-mediated increase in vagal activity. The presence of such an agent unmasks the direct stimulant effect of norepinephrine on heart rate.

Categories:

Pharmacokinetics & Autonomics

A 28-year-old man presents to your office with the sudden onset of weakness in his left arm. He was recently arrested and released on charges of spousal abuse. Yesterday he gave several guns to a friend of his because he "didn't trust himself with them." Mental status examination reveals a peculiar calmness and the lack of concern about his weakness. What is the most likely diagnosis?

- A. Acute stress disorder
- B. Specific phobia
- C. Obsessive-compulsive disorder
- D. Conversion disorder**
- E. Somatoization disorder

You answered:

A

Explanation:

Conversion disorder is suggested by loss of motor control or sensory function that is not fully explained by physiologic mechanisms and is associated with psychological conflict. Affected individuals often demonstrate an emotional blandness that is sometimes referred to as "la belle indifférence."

Categories:

Psychiatry & Psychology

A 50-year-old man complains of a 4-month history of memory impairment. Mental status examination reveals an alert and attentive patient with average vocabulary. He is able to recall one out of three objects after five minutes and has noticeable difficulties with reasoning and abstraction. Which of the following is the most likely diagnosis?

- A. Mild mental retardation
- B. Major depressive disorder
- C. Delirium
- D. Dysthymia
- E. Dementia

You answered:

A

Explanation:

The symptoms are most suggestive of dementia, which is characterized by memory disturbance coupled with other cognitive disturbances such as difficulties with abstraction, aphasia, apraxia, and agnosia. Delirium (choice C) is distinguished from dementia by the additional presence of impaired awareness and attention. It usually has a shorter course than dementia and symptom severity may fluctuate. Dysthymia (choice D) is characterized by a mild depression that lasts at least 2 years. Major depressive disorder (choice B) may include complaints of difficulties with memory. However, cognitive testing does not usually reveal marked deficits. Mental retardation (choice A) may be characterized by difficulties with reasoning and abstraction. However, vocabulary is usually limited and a specific complaint of a short history of memory impairment is unlikely.

Categories:

A young man riding a bull was thrown off and sustained an injury to the lateral aspect of his left knee. Following the injury, he was unable to evert his foot effectively. This patient most likely experienced trauma to which of the following?

A. Peroneal nerve

B. Anterior tibial nerve

C. Sciatic nerve

D. Posterior tibial nerve

E. Obturator nerve

You answered:

A

Explanation:

The peroneal nerve (also known as the superficial peroneal nerve) winds around the upper aspect of the fibula and can be traumatized when that bone is fractured. It supplies the peroneus longus and brevis, both of which permit eversion of the foot. These muscles also induce plantar flexion, but because the main plantar flexors are spared, this function is not impaired. The posterior tibial nerve [also known as the tibial nerve] (choice B) innervates the muscles of the posterior compartment-gastrocnemius, soleus, and plantaris-which are responsible for plantar flexion. Tibialis anterior and extensor hallucis longus dorsiflex and invert the foot, while extensor digitorum and peroneus tertius dorsiflex and evert the foot. All these muscles lie in the anterior compartment of the leg and are innervated by the anterior tibial nerve [also known as the deep peroneal nerve] (choice A). The sciatic nerve (choice C) supplies the posterior muscles of the thigh, while the obturator nerve (choice E) supplies the adductors of the thigh.

Categories:

Neurology

At birth, a female neonate is noted to be small for 39-weeks' gestational age. Physical examination reveals microcephaly, short palpebral fissures, and maxillary hypoplasia. Which of the following conditions is most likely to lead to these findings?

A. Fetal alcohol syndrome

B. Trisomy 18

C. Congenital rubella

D. Placenta previa

E. Trisomy 21

You answered:

A

Explanation:

Alcohol is one of the most common environmental teratogens affecting fetuses, although the effects can be subtle. The children affected tend to continue to be developmentally impaired. Congenital rubella, which has its major effects during organogenesis in the first trimester, results in more pronounced defects, including congenital heart disease. Placenta previa, a low-lying placenta at or near the cervical os, can cause significant hemorrhage at the time of delivery, or uteroplacental insufficiency with growth retardation before delivery. Placental causes of intrauterine growth retardation result in asymmetric growth retardation with sparing of the brain. The findings of trisomy 21 are subtle at birth, but typically include brachycephaly, not microcephaly. Trisomy 18 presents with a prominent occiput, micrognathia, and low set ears.

Categories:

Embryology & Congenital Disorders

A 30-year-old female has a long history of recurring, mild upper respiratory tract infections and has also had diarrhea for most of her life, although not severe enough to have malabsorption with weight loss. After an episode of trauma with blood loss, she receives a blood transfusion that is complicated by an anaphylactic reaction. Which of the following underlying conditions best explains these findings?

- A. Cystic fibrosis
- B. Selective IgA deficiency
- C. HIV infection
- D. Wegener's granulomatosis
- E. Wiskott-Aldrich syndrome

You answered:

A

Explanation:

There is a failure of terminal differentiation of B cells into IgA-secreting plasma cells. Lack of IgA in mucosal secretions leads to increased risk for respiratory and gastrointestinal infections. There are IgA antibodies in serum that can lead to transfusion reaction with IgA in donor serum. HIV infection is marked by failure of cell-mediated immunity. Wiskott-Aldrich syndrome is associated with eczema and thrombocytopenia. Cystic fibrosis is associated with recurrent pneumonias, bronchiectasis, and pancreatic insufficiency. Wegener's granulomatosis causes necrotizing granulomas of the upper airway and lung and necrotizing glomerulonephritis.

Categories:

Immunology

A 6-year-old boy recently diagnosed with juvenile rheumatoid arthritis is seen by his pediatrician with symptoms of headache, dizziness, tinnitus, sweating, and hyperventilation for 2 days. Which of the following drugs may be associated with these adverse effects?

- A. Ketorolac
- B. Acetaminophen
- C. Naproxen sodium
- D. Aspirin**
- E. None of the above

You answered:

A

Explanation:

All of these effects are seen in mild chronic salicylate toxicity, also known as salicylism. None of the drugs listed except aspirin produce this toxic syndrome.

Categories:

Oncology, MS, Derm

An 10-month-old infant presents with a 2-day history of a mild upper respiratory tract infection, with serous nasal discharge, temperature of 39°C, increased fussiness, and decreased appetite. Examination reveals a tachypneic infant with audible wheezing, nasal flaring, and use of the accessory muscles, as well as intercostal and subcostal retractions. Expiratory wheezes are present. Which of the following is the most likely diagnosis?

- A. Bronchiolitis
- B. Croup
- C. Cystic fibrosis
- D. Asthma
- E. Acute epiglottitis

You answered:

A

Explanation:

Bronchiolitis results from inflammatory obstruction of the smaller airways. The inflammation occurs during the first 2 years of life, with a peak incidence at 6 to 12 months of age. Bronchiolitis starts insidiously as an upper respiratory infection, but develops to include wheezy dsypnea and tachypnea. Physical examination reveals tachypnea, nasal flaring, rales, wheezes, and retractions. Patients begin to show gradual improvement after 72 hours in uncomplicated cases. Asthma (choice D) can easily be confused with bronchiolitis, but asthma usually includes a history or repeated attacks of wheezing and a family history of asthma. Croup (choice B) is characterized by a brassy, barking cough. Epiglottitis (choice E) usually occurs in older children and is associated with high fever, severe respiratory distress, and drooling. Cystic fibrosis (choice C) presents with recurrent pulmonary infections, and gastrointestinal malabsorption secondary to pancreatic insufficiency.

Categories:

A 16-year-old girl experiences a tonic-clonic seizure with loss of consciousness at school. The seizure continues as she is being transported to the emergency department. Shortly after arriving at the hospital, the patient suffers another seizure. Which of the following is the drug of choice for treatment of this patient?

- A. Valproic acid
- B. Carbamazepine
- C. Diazepam
- D. Ethosuximide
- E. Gabapentine

You answered:

A

Explanation:

Intravenous (IV) diazepam or lorazepam are the drugs of choice in the treatment of epilepticus. Ethosuximide, carbamazepine, gabapentine and valproic acid are useful in the chronic preventions of generalized tonic-clonic seizures.

Categories:

Neurology

Blood glucose: 110 mg/dL (80-120)

Blood urea nitrogen: 30 mg/dL (7-18)

Urine osmolality: 150 mOsm/kg (275-295)

The most likely diagnosis is

A. Diabetes insipidus

B. Renal glycosuria

C. Psychogenic polydipsia

D. Inappropriate antidiuretic hormone syndrome

E. Hyperthyroidism

You answered:

A

Explanation:

Metastatic tumors rarely cause diabetes insipidus, but of the tumors that may cause it, carcinoma of the breast is by far the most common. In the patient discussed in the question, the diagnosis of diabetes insipidus is suggested by hypernatremia and a low urine osmolality. Psychogenic polydipsia is an unlikely diagnosis, since serum sodium is usually mildly reduced in this condition. Renal glycosuria would be expected to induce a higher urine osmolality than this patient has, because of the osmotic effect of glucose. Finally, the findings of inappropriate antidiuretic hormone syndrome are the opposite of those observed in diabetes insipidus and thus are incompatible with the clinical picture in this patient.

Categories:

Endocrine

A 2-year-old child that was breast fed for the first year of life, presents now with failure to thrive. Hepatomegaly and ecchymoses of the skin are found on physical examination. The child exhibits convulsions, and the blood glucose is found to be only 40 mg/dL. The serum lactate level is elevated. Liver biopsy shows cells filled with clear vacuoles that stain positively for glycogen. Which of the following conditions best explains these findings?

- A. Pompe disease
- B. Tay-Sachs disease
- C. McArdle syndrome
- D. Hurler syndrome
- E. Von Gierke disease

You answered:

A

Explanation:

This patient has von Gierke disease. Glycogen is not metabolized readily to glucose, because of the deficiency of glucose-6-phosphatase and the patients have severe hypoglycemia, leading to convulsions. Intracytoplasmic accumulations of glycogen occur mainly in liver and kidney. Another form of glycogen storage disease, McArdle syndrome, results from a deficiency of muscle phosphorylase and leads to muscle cramping. Tay-Sachs disease is characterized by a deficiency in hexosaminidase A and results in severe neurologic deterioration. In Hurler syndrome, the enzyme α -L-iduronidase is deficient. Affected children have skeletal deformities and buildup of mucopolysaccharides in endocardium and coronary arteries, leading to heart failure. Cardiomegaly and heart failure mark Pompe disease, another form of glycogen storage disease.

Categories:

Biochemistry & Cell Biology

A 65-year-old, slender Asian woman has a family history of osteoporosis. She had a complete hysterectomy 25 years ago for dysfunctional uterine bleeding. She takes adequate amounts of vitamin D and calcium, walks two miles daily, and takes daily oral estrogen replacement without progesterone. Bone densitometry studies indicate that she is above the fracture threshold. By which of the following mechanisms is the estrogen most likely preventing osteoporosis in this patient?

- A. Enhanced bone resorption
- B. Enhanced formation and decreased resorption
- C. Decreased bone resorption
- D. Enhanced bone formation
- E. Decreased bone formation

You answered:

A

Explanation:

Osteoporosis is a disease characterized by a decrease in trabecular bone density resulting in fractures. After age 20, but before menopause, physiological bone loss in women is about 0.5% per year. After menopause, due to estrogen deficiency, bone loss accelerates to 5% per year. Estrogen is thought to work primarily by decreasing bone resorption, rather than by enhancing bone formation (choice D). Therefore, (choice B) enhanced bone formation and decreased resorption is incorrect. Decreased bone formation (choice E) and enhanced bone resorption (choice A) are clearly incorrect, because they will result in exacerbation rather than prevention of osteoporosis.

A 45-year-old female presents with complaints of increasing fatigue and lethargy for 3 months. As part of a workup by her physician, she is found to be anemic and to have a serum creatinine level of 5.8 mg/dL (0.6–1.2 mg/dL). Urinalysis shows 2+ proteinuria, and the ANA test result is negative. A renal biopsy reveals hypercellular glomeruli, and electron-dense deposits along the lamina densa of the glomerular basement membrane. Which of the following forms of glomerulonephritis is most likely?

- A. Membranous glomerulonephritis
- B. Chronic glomerulonephritis
- C. Postinfectious glomerulonephritis
- D. Rapidly progressive glomerulonephritis
- E. Membranoproliferative glomerulonephritis

You answered:

A

Explanation:

She has type II membranoproliferative glomerulonephritis, or dense-deposit disease, which usually leads to chronic renal failure. A postinfectious glomerulonephritis often has a hypercellular glomerulus with infiltration of polymorphonuclear leukocytes, but no basement membrane thickening. A rapidly progressive glomerulonephritis is marked by crescents. Chronic glomerulonephritis is a term often used when there is sclerosis of many glomeruli, but no clear cause. In membranous glomerulonephritis, there is just basement membrane thickening and small electron-dense deposits.

Categories:

Renal

A. A

B. B

C. C

D. D

E. E

You answered:

A

Explanation:

Approximately 70% of the filtered water is normally reabsorbed from the proximal tubule. If than 70% of a solute is reabsorbed in the proximal tubule, its F/P ratio (the ratio of the concentration of the substance in the filtrate to the concentration of the substance in the plasma) will rise as water is reabsorbed. If more than 70% of the solute is reabsorbed, its F/P ratio will fall. The F/P ratio of a substance can also increase if it is secreted into the proximal tubule. The F/P ratio of substance A rose as water was reabsorbed from the proximal tubule, indicating that the reabsorption of the solute did not keep up with the reabsorption of the water. Inulin is not reabsorbed from the proximal tubule at all. Therefore, its concentration will increase. Because two-thirds of the water is reabsorbed from the proximal tubule, the concentration of the inulin will be approximately three times higher at the end of the proximal tubule than it is at the beginning.

Categories:

Renal

Which of the following statements about prostaglandin biosyntheses is true?

A. Glucocorticoids inhibit both thromboxane and leukotriene synthesis

B. Aspirin inhibits both thromboxane and leukotriene syntheses

C. Lipoxygenase converts arachidonic acid to endoperoxides

D. Sodium salicylate causes irreversible acylation of prostaglandin H synthase

E. Zileuton inhibits cyclooxygenase

You answered:

A

Explanation:

Sodium salicylate does not cause acylation of prostaglandin H synthase. Rather, it inhibits the enzyme by a different, reversible mechanism. Glucocorticoids inhibit phospholipase A2, thereby inhibiting both thromboxane and leukotriene synthesis. Aspirin does not diminish leukotriene synthesis. Zileuton inhibits lipoxygenase which converts arachidonic acid to hydroperoxides.

Categories:

Biochemistry & Cell Biology

A 19-year-old previously healthy male suddenly collapses while at a rock concert with his friends. He is taken to the hospital, requiring resuscitation with defibrillation en route to establish a normal cardiac rhythm. On admission, vital signs show his temperature to be 41°C, respirations 38, heart rate 115/min, and blood pressure 170/95 mm Hg. His pupils are dilated. Which of the following drugs is most likely responsible for these findings?

A. Cocaine

B. Marijuana

C. Ethanol

D. Heroin

E. Phencyclidine

You answered:

A

Explanation:

Cocaine is a powerful vasoconstrictor and has a variety of vascular effects. Many complications result from the cardiovascular effects that include arterial vasoconstriction with ischemic injury and arrhythmias. Hyperthermia is another complication. Acute ethanolism may lead to CNS depression, but not serious immediate cardiac effects. Heroin may produce acute pulmonary edema. Marijuana has no serious acute toxicities. Phencyclidine (PCP) produces an acute toxicity that mimics psychosis.

Categories:

Toxicology

Drug F is converted to an inactive metabolite in the liver by a P-450-catalyzed biotransformation. Another drug, isoniazid, inactivates this particular P-450. If isoniazid and drug F are administered simultaneously, isoniazid will

- A. Shift the dose-response curve of drug F and decrease the plasma half-life
- B. Decrease the half-life for plasma levels of drug F
- C. Shift the dose-response curve of drug F to the right
- D. Not affect the dose-response curve
- E. None of the above

You answered:

A

Explanation:

Inactivation of P-450 will shift the dose-response curve to the left and will increase the plasma half life ($t_{1/2}$) of the competing drug, drug F.

Categories:

Pharmacokinetics & Autonomics

What effects would you see with a lesion to the ulnar nerve at the brachial plexus?

- A. inability to extend fingers
- B. inability to initiate arm abduction
- C. inability to abduct fingers
- D. inability to oppose thumb
- E. inability to flex elbow

You answered:

A

Explanation:

The ulnar nerve innervates multiple muscles including the flexor carpi ulnaris and medial 1/2 of flexor digitorum profundus (damage results in CLAW HAND and inability to flex the distal IP joint of ring and little finger). The deep branch of the ulnar nerve innervates the hypothenar muscles, adductor pollicis (damage results in difficulty with thumb adduction), ulnar two lumbricals, and all of the interosseous muscles (damage results in an inability to abduct or adduct the fingers). The superficial branch innervates the skin over medial hand.

Categories:

Neurology

A 45-year-old male comes to the emergency room complaining of severe upper abdominal pain which he states has been present for 3 days. You take a full history and note that he is on multiple medications. On physical exam you notice that his epigastric region is extremely tender to palpation, there is a ecchymosis on his left flank, and his breathing is mildly increased. You check multiple labs, but your first one to return is the basic metabolic panel which only reveals hypocalcemia. Which of the following drugs is responsible for this patient's symptoms?

- A. saquinavir
- B. nevirapine
- C. zidovudine
- D. delavirdine
- E. stavudine

You answered:

A

Explanation:

This patient's symptoms point to a diagnosis of pancreatitis which includes persistent upper abdominal pain, Grey-Turner's sign (flank ecchymosis indicating intra-abdominal hemorrhage and a poor prognosis), difficulty breathing deeply due to diaphragm irritation, and hypocalcemia from fat necrosis/soaponification. Of the antiretrovirals listed, the only one associated with pancreatitis is stavudine.

Categories:

Microbiology , Gastroenterology